





Issued October 30, 1907.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF STATISTICS—BULLETIN NO. 67.

VICTOR H. OLMSTED, Chief of Bureau.

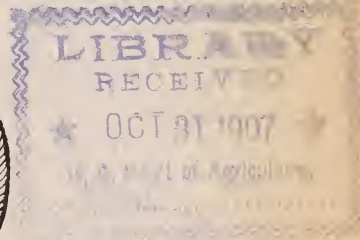
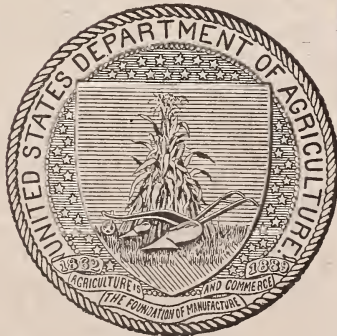
# OCEAN FREIGHT RATES

## AND THE CONDITIONS AFFECTING THEM.

BY

FRANK ANDREWS,

*Scientific Assistant in Transportation and Assistant Chief of Division of  
Foreign Markets.*



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1907.



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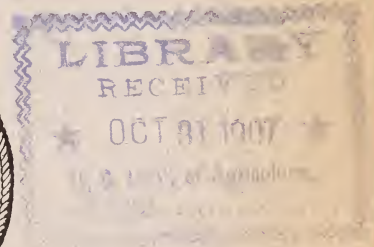
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## LETTER OF TRANSMITTAL

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF STATISTICS,  
*Washington, D. C., July 31, 1907.*

SIR: I have the honor to transmit the report of an investigation conducted by Frank Andrews, Assistant Chief of the Division of Foreign Markets, concerning recent changes in ocean freight rates and the conditions affecting them, as bearing upon the exports of the farm products of this country. In collecting the information contained in this report Mr. Andrews visited nearly all of the Gulf and Atlantic ports.

It is believed that this information will be of practical use to all persons concerned in the shipping of our surplus farm products to foreign countries, and the publication of the manuscript as Bulletin No. 67 of this Bureau is therefore recommended.

Respectfully,

C. C. CLARK,  
*Acting Chief of Bureau.*

HON. JAMES WILSON,  
*Secretary of Agriculture.*

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# OCEAN FREIGHT RATES AND THE CONDITIONS AFFECTING THEM.

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## PRICES AND OCEAN FREIGHTS.

### TRANSPORTATION AND THE FOREIGN MARKET.

Freight is an item of considerable importance in the price of an article in a world's market, such as London or Hamburg. The services rendered by inland carriers—wagons, boats, and railroads—in forwarding products for export often involve freight costs far greater than the charges made by ocean vessels, and consequently have more influence upon prices. Ocean rates nevertheless form an appreciable percentage of the total cost of production and distribution of many articles in a world's market, and changes in these rates affect to a greater or less degree the welfare of farming interests.

At present (1907) wheat is shipped from the Pacific coast of the United States to England, a distance of 15,000 miles, at rates averaging from 15 to 17 cents per bushel, while from New York to Liverpool, a distance of 3,000 miles, the average rate on wheat for the five years 1902–1906 was about 3 cents per bushel. The difference between the farm price of wheat in the United States and the price of the same wheat to the English miller has become smaller in recent years. The total freight charge on wheat exported from the United States to England, including cost of hauling from farms, railroad charges in the United States, and ocean freight, was estimated to average in 1905–6 about 27 cents per bushel.<sup>a</sup>

It is understood, of course, that freight charges form only part of the difference between what the producer receives and what the consumer pays, but it is known that these charges constitute an important part. Their reduction has considerable influence in bringing nearer together the price paid for an article by the foreign consumer and that received by the American producer.

### QUOTATIONS OF FREIGHT RATES.

#### DECLINE OF THIRTY YEARS.

The reduction in ocean freights on farm products in the last thirty years has been great. In 1876 wheat was carried from New York to Liverpool at a mean rate for the year of 16.8 cents (gold) per

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<sup>a</sup> Yearbook, U. S. Department of Agriculture, 1906, p. 384.

bushel and in 1906 the mean rate was only 3 cents per bushel. On salt beef the rate in 1876 was \$1.42 per tierce if carried in steamships and \$1.18 if carried in sailing vessels, while in 1906 the mean rate charged by steamships was only 54 cents per tierce, or less than one-half the charge thirty years before. To Antwerp from New York in 1876 the mean rate on salt beef carried in steamships was \$2.24 per tierce; in 1906 the rate was 79 cents. These examples serve to illustrate the reductions in cost of ocean transportation by steamships.

Sailing vessels have also brought about economies in the carrying trade. In 1876 the average rate charged by sailing vessels for carrying grain from San Francisco to ports in the United Kingdom was equivalent to 32 cents per bushel (60 pounds) and in 1906 the average rate was about 15 cents per bushel.

The cause of these reductions in ocean freights is largely connected with improvements in the construction of vessels, in methods of handling them and their cargoes, and in the modification of various charges levied at different ports. It cost a shipowner less to carry a given quantity of merchandise in 1906 than it did in 1876, and the smaller cost in 1906 made it commercially possible to charge much lower rates than shipowners could have accepted without loss thirty years before.

#### DEMAND AND SUPPLY.

While cost of performing the service fixes the minimum rates at which shipowners can afford to carry goods, ocean freight rates, at a given time and place, depend largely upon demand and supply; that is, upon the relative quantities of merchandise to be shipped and the capacity of vessels available for carrying it. A large number of vessels in a port where but a small quantity of traffic is offered tends to cause low rates from that port, while, on the other hand, where there is much merchandise to be shipped and vessels are relatively scarce, shipowners can obtain higher rates.

The volume of ocean space, or "tonnage," as it is frequently called, available in a given branch of traffic is subject to increase in at least two ways: First, by the building of new vessels, and, second, by the release of a number of vessels from other branches of traffic. An increase in tonnage may either cause a reduction of rates or prevent a rise. The tonnage available for certain trades is subject also to decreases, but these are generally due to vessels being attracted from the trade in question by better freight rates elsewhere rather than to the loss of any considerable number of ships.

The influence upon freight rates due to stopping an important branch of ocean traffic is illustrated by events which occurred at the close of the South African war. A considerable amount of ocean tonnage had been employed by the British Government in the trans-

portation of troops and supplies to the scene of conflict, and when the necessity for this service came to an end, early in 1902, a large amount of cargo space was thrown out of employment and the vessels thus affected joined in the competition for mercantile traffic. The effect on rates, especially in the charter trade, was marked. By referring to Table 2, which gives the rates on grain from three United States ports to Cork for orders (p. 11), it will be noted that in 1901 the mean rate on grain from New York to Cork for orders was 12.48 cents per 100 pounds and the mean rate for 1902 was only 10.54. A similar decrease took place in the rates from Baltimore and from San Francisco. An increase in charter rates is to be noted during the first part of this war. The year 1900, the second year of the war, was a period of high rates for chartered vessels. Table 2 shows in 1900 an increase over the previous year of over 3 cents per 100 pounds from Baltimore, and also from New York to Cork for orders, and an increase of 12.3 cents per 100 pounds on grain exported from San Francisco to Cork for orders.

#### EFFECTS OF HARVESTS.

Moreover, the volume of traffic is subject to variations, some of the most important of which are caused by the condition of harvests in various regions. Poor crops tend to bring rates down, while, on the other hand, abundant harvests promise higher freight rates, which may be still further increased if the traffic in some other articles causes another strong demand for "ocean room" just about the time the produce of the harvest is to be shipped.

Another instance of a considerable supply of "ocean room" being thrown upon the freight market was afforded in 1903, when the wheat harvest in Australia failed. While the wheat was still standing in the fields a number of vessels started for Australian ports to carry a share of the expected wheat surplus to Europe. Meanwhile unfavorable weather conditions resulted in a crop failure, and grain cargoes in Australia were scarce. A considerable number of ships was unexpectedly thrown out of employment. Some of them sailed to the Pacific coast of the United States for loads of wheat or barley, while others went elsewhere in search of cargoes. This condition no doubt contributed toward reducing the mean rate on wheat between San Francisco and the United Kingdom from about 32 cents per bushel in 1902 to about 18 cents in 1903.

The rates which had declined at the close of the South African war continued rather low until the big harvest in the United States in 1905, when there was a revival in the demand for ships for charter, especially on the Atlantic seaboard. It had been reported that the charter traffic had entirely died out at the four largest ports along the North Atlantic coast, but in the fall of 1905 there was a

considerable number of grain charters made from Baltimore and Boston.

On the Pacific coast it is not so easy to trace the effects of the demand for grain ships in 1905, owing to the influence of a conference or combine formed by owners of British, German, and French sailing ships about 1904. This conference undertook, and still undertakes (1907), to maintain a schedule of minimum rates from Australia and from the United States Pacific coast to the United Kingdom. Members of the conference are to accept no cargoes at rates below the minimum fixed by their agreement.

#### RETURN CARGOES.

An important influence in determining the cost of hiring a ship is the prospect of securing another cargo at or near the port of discharge. Lower rates are accepted by a ship for carrying goods to a place where and at a time when a return cargo may be secured than to a place offering no return shipments. For instance, the ports on the Pacific coast are desirable destinations for sailing vessels expecting to reach that coast in the fall and early winter, for there at that time a supply of wheat and barley is ready for shipment to Europe. The same applies to other ports which are outlets for surplus crops.

Early in April, 1907, a steamer was chartered to carry a cargo of general merchandise from New York to Australia and New Zealand, the rate named being 31 shillings per ton. About two weeks later another vessel was chartered to make a similar voyage for 28 shillings 6 pence per ton. This reduction was due partly to the fact that the second vessel was expected to reach its destination when the prospects for securing a return cargo were more favorable than for the other vessel. The first ship was to leave New York in April or May; the second was chartered for late in May.

It will be seen from these few examples that the shipping business is a world traffic, and that influences in one region are felt in a number of others. The shipper at Tacoma, Galveston, or Newport News has a direct interest in the crop conditions and the supply of vessels in the neighborhood of Calcutta, Odessa, or Buenos Aires.

#### BERTH RATES ON GRAIN.

Berth rates in ocean transportation refer to those charged by regular steamship lines. The berth rates quoted on grain from North Atlantic ports to Liverpool are expressed in pence per bushel of 60 pounds. When it is necessary to reduce English money to its United States equivalent for rates paid at destination on shipments to the



United Kingdom from the United States, the pound sterling is taken as equivalent to \$4.80, and 5 per cent is added for primage. For instance, a quotation of 2 pence per bushel would be equivalent to 4 cents plus 5 per cent of 4 cents, making a total of 4.2 cents per bushel. The capacity of the liners being large and grain being a desirable article to carry as ballast, freight rates on this commodity from New York to Liverpool sometimes fall to less than 2 cents per bushel. In the published quotations of ocean freights for most articles, the figures usually represent what the steamship lines or the forwarding agents ask, and not necessarily the rates actually paid. In the case of grain, however, there seems to be more competition among shippers and carriers, and the rates published seem to be nearer those actually paid than are the quotations on many other articles.

It will be noted that for the first and the third of the five-year periods shown in Table 1, the mean rates from New York to Liverpool were not widely different from each other, and that they were much higher than during the other periods. The same was also true of the corresponding rates from Baltimore and New Orleans. The period of lowest rates was from 1901 to 1906.

TABLE 1.—*Mean ocean freight rates on WHEAT, CORN, and RYE from three United States ports to Liverpool, 1886-1906.<sup>a</sup>*

[Cents per 100 pounds.]

Calendar year.	To Liverpool, from—			Calendar year.	To Liverpool, from—		
	New York.	Balti- more.	New Orleans.		New York.	Balti- more.	New Orleans.
1886.....	11.59	12.71	16.11	1900.....	11.81	13.48	17.32
1887.....	8.75	10.29	15.00	1901.....	4.38	6.34	8.72
1888.....	9.19	10.64	14.44	1902.....	5.03	6.16	7.22
1889.....	13.78	15.47	18.97	1903.....	5.03	5.39	8.33
1890.....	8.53	9.70	12.92	1904.....	3.94	4.72	8.75
1891.....	10.94	11.86	14.78	1905.....	5.69	6.26	10.02
1892.....	9.19	11.27	12.50	1906.....	5.03	6.72	11.43
1893.....	8.31	10.01	13.60				
1894.....	6.78	7.71	9.67	Mean for 5 years:			
1895.....	8.97	7.72	10.30	1886-1890.....	10.37	11.76	15.49
1896.....	10.28	10.22	14.17	1891-1895.....	8.83	9.71	12.17
1897.....	10.72	11.20	13.35	1896-1900.....	10.67	11.44	14.82
1898.....	12.03	12.53	16.23	1901-1905.....	4.81	5.77	8.73
1899.....	8.53	9.76	13.05				

<sup>a</sup> Quotations for New York from reports of the New York Produce Exchange; for Baltimore from the reports of the Baltimore Chamber of Commerce; for New Orleans, figures for 1886-1903 are based upon reports of the Merchants' Exchange of St. Louis, and figures for 1904-1906 upon quotations issued by the Foreign Freight Agent of the Illinois Central Railroad. Rates for 1886-1899 from New Orleans probably include cost of transfer to ocean vessels at that port.

#### FREIGHTS ON FULL CARGOES.

There are at least three points of difference between the quotations in Table 1 and those in Table 2. First, the rates in Table 1 apply to a definite destination, while the other quotations do not; shipments to "Cork for orders" are not consigned to their ultimate destination until the ship has called at Queenstown or some other place for

orders as to the port or ports of discharge. The indefinite destination of shipments to "Cork for orders" is one influence tending to make the rates in Table 2 higher than the corresponding rates in Table 1, for the shipowner is left in some doubt as to where his vessel will be released, and hence his compensation is often higher than if he knew the final destination at the time of loading, and would thus have a few weeks in which to seek for a return cargo at or near the point of discharge; and, moreover, a shipper may be willing to pay higher rates for the privilege of diverting a shipment to any destination, within certain limits, that might offer the best market.

These causes, however, are not thought to have as much influence as the second point of difference between the tables, which is this: The rates quoted in Table 1, as was mentioned above, are those charged by regular steamship lines, while Table 2 gives the quotations of ships chartered for voyages which are generally made to ports not reached by the liners. The larger size of vessels belonging to the regular steamship lines, as well as other advantages, enables them to charge much lower rates than can be accepted without loss by "tramp" ships.

A third difference between the quotations in the two tables is the fact that berth rates apply almost universally to partial cargoes, since the liners carry miscellaneous lots of freight, while chartered ships to Cork for orders regularly carry full cargoes. In some respects it is considered more desirable to ship grain in partial than in full cargoes. The risk on a lot of grain or of other articles is much less when it is divided into two or more parcels, each carried in a separate vessel, than if all were loaded on one ship.

On the Atlantic seaboard the practice of shipping cargoes of wheat to ports of call for orders has been much modified, the final destination being left undecided at first perhaps, but finally determined before the ship leaves the port of loading. In such a case, however, the freight may be different from that named in the charter, the rate to Cork for orders being taken as a basis and the actual rate determined according to certain rules. As in Table 1, the rates in Table 2 were lowest in the period 1901-1906.

It may be of interest to note some of the high rates prevailing prior to 1886. In 1873 the average rate on wheat from San Francisco to Cork for orders was 86 shillings per ton (2,240 pounds), or more than 55 cents per bushel. In 1876 the rate had dropped as low as 26 cents per bushel, which is only 1 cent above the average rate for 1901 and only 2 cents above the average rate for 1900. The rates as given in both Tables 1 and 2 are reduced to units of 100 pounds for the sake of uniformity, since they refer to wheat, corn, and rye.



TABLE 2.—Mean ocean freight rates on **WHEAT, CORN, and RYE** from three United States ports to Cork for orders, 1886–1906.<sup>a</sup>

[Cents per 100 pounds.]

Calendar year.	To Cork for orders, from—			Calendar year.	To Cork for orders, from—		
	New York.	Balti-more.	San Fran-cisco.		New York.	Balti-more.	San Fran-cisco.
1886.....	16.98	16.72	33.04	1900.....	19.25	19.14	40.18
1887.....	15.18	14.45	29.02	1901.....	12.48	12.27	41.52
1888.....	18.00	17.88	27.68	1902.....	10.54	10.37	32.14
1889.....	22.53	22.92	33.12	1903.....	11.35	11.07	18.48
1890.....	16.86	17.25	37.86	1904.....	11.73	10.94	15.80
1891.....	17.68	16.48	43.21	1905.....	13.39	13.20	23.21
1892.....	15.50	15.23	33.66	1906.....	12.65	12.58	25.00
1893.....	13.93	13.39	22.59	Mean for 5 years:	17.91	17.84	32.14
1894.....	14.46	14.01	28.30				
1895.....	14.19	13.65	28.12				
1896.....	15.83	15.10	28.66				
1897.....	16.43	15.70	26.79				
1898.....	18.08	17.72	22.14	1886–1890.....	15.15	14.55	31.18
1899.....	16.08	15.88	27.86	1891–1895.....	17.13	16.71	29.13
				1896–1900.....	11.90	11.57	26.23
				1901–1905.....			

<sup>a</sup> Quotations for New York from reports of New York Produce Exchange; for Baltimore from reports of Baltimore Chamber of Commerce; and for San Francisco from the San Francisco Daily Commercial News and the Annual Review issued by that newspaper for 1905.

## CHARGES ON COTTON.

Ocean freight rates on cotton from three United States ports to three ports in Europe were in 1901–1905 only one-half of the rates in 1886–1890. To Liverpool the rates, as quoted in Table 3, from New York declined from a mean of 31.4 cents per 100 pounds in 1886–1890 to 14.2 cents in 1901–1905; from New Orleans the corresponding rate fell during the same period from 60.7 cents to 32.2 cents per 100 pounds, while in the case of Savannah the change was much greater, the mean rate from that port to Liverpool in 1886–1890 being 67.2 cents and in 1901–1905 only 28.2 cents per 100 pounds. In Table 3 the rates to Europe from New Orleans and Savannah, as well as from New York, refer to direct shipments. Approximate charges on shipments in coastwise steamers from Savannah to New York and thence to Liverpool, Bremen, and Havre may be estimated from data given in Table 3.

The quotations from which Table 3 was computed represent rates asked and not necessarily the rates actually paid. The figures as given, however, are regarded as approximately correct, and are useful in illustrating the marked downward tendency of ocean freight charges from 1886 to 1906.

TABLE 3.—Mean annual quotations of ocean freight rates on **COTTON** from New York, New Orleans, and Savannah to ports named, 1886-1906.<sup>a</sup>

[Cents per 100 pounds.]

Calendar year.	New York to—			New Orleans to—			Savannah to—			
	Liver- pool.	Bre- men.	Havre.	Liver- pool.	Bre- men.	Havre.	Liver- pool.	Bre- men.	Havre.	New York.
1886.....	31.0	36.3	34.4	61.6	64.7	65.3	54.7	60.5	64.5	28.2
1887.....	27.7	38.3	36.0	59.2	68.2	64.3	62.4	63.8	65.6	28.4
1888.....	28.4	37.2	39.7	60.1	71.5	66.7	74.4	84.0	46.4	25.0
1889.....	41.9	68.6	46.4	71.0	78.8	76.0	80.6	83.6	82.8	27.6
1890.....	28.0	46.7	32.6	51.6	59.8	58.1	63.8	68.9	73.8	25.3
1891.....	31.3	37.6	33.8	46.7	49.5	48.7	64.2	71.5	65.2	26.5
1892.....	23.4	.....	.....	38.9	49.1	45.3	38.1	52.2	54.1	20.1
1893.....	26.8	35.5	39.4	40.5	45.2	44.5	43.9	44.3	46.0	20.2
1894.....	25.7	32.0	.....	39.9	47.8	41.8	42.3	42.7	47.8	19.8
1895.....	21.2	27.4	.....	34.9	41.9	39.5	36.2	36.9	37.4	20.0
1896.....	24.4	29.6	.....	38.3	45.9	43.4	51.0	43.1	57.7	20.0
1897.....	20.4	50.3	.....	34.0	42.7	45.1	42.3	44.0	46.2	19.8
1898.....	26.2	34.1	.....	46.2	51.9	48.9	46.5	43.2	52.0	19.6
1899.....	18.7	28.1	.....	38.7	44.8	43.2	37.8	37.1	41.2	20.1
1900.....	28.0	36.2	.....	51.0	54.2	47.5	46.2	46.6	48.4	20.0
1901.....	13.4	23.2	.....	32.5	37.6	37.2	31.4	50.1	34.3	23.3
1902.....	12.5	18.3	.....	28.7	30.5	30.5	26.6	24.1	28.3	20.0
1903.....	14.8	23.3	.....	34.6	33.8	33.9	26.8	26.1	29.0	20.0
1904.....	13.7	21.9	22.8	31.4	31.9	31.7	28.4	25.4	32.9	20.0
1905.....	16.6	21.2	21.4	33.8	32.7	34.1	27.8	26.6	35.3	20.0
1906.....	17.0	21.3	28.2	34.2	36.2	35.2	30.4	50.4	33.1	20.0
Mean for 5 years:										
1886-1890.....	31.4	45.4	37.8	60.7	68.6	66.1	67.2	72.2	66.6	26.9
1891-1895.....	25.7	33.1	36.6	40.2	46.7	44.0	44.9	49.5	50.1	21.3
1896-1900.....	23.5	31.7	.....	41.6	47.9	45.6	44.8	42.8	49.1	19.9
1901-1905.....	14.2	21.6	22.1	32.2	33.3	33.5	28.2	26.5	32.0	20.7

<sup>a</sup> Rates from New York, 1886-1888, inclusive, taken from the Commercial and Financial Chronicle; 1889-1906, from the Journal of Commerce and Commercial Bulletin. Rates for New Orleans for 1886 taken from the Times-Democrat, and for 1887-1906 from the Picayune. Rates from Savannah taken from the Morning News.

## RATES QUOTED FROM BOSTON TO EUROPEAN PORTS.

The quotations shown in Tables 4, 5, and 6 represent the rates asked by forwarding agents or steamship lines and are probably higher in some instances than the rates actually paid. They serve, however, to show fluctuations for the same article or the same destination from one year to another, and are useful in giving an idea of approximate rates; but they should be used with caution, if at all, in comparing the rates from one port with those from another.

The last column of Table 4, which gives the mean rates for a number of ports, shows higher quotations for 1906 than for any one of the preceding three years. The rates on flour and oil cake, as given in this table, are nearly equal; lard in pails is charged a higher rate than provisions shipped in larger packages; tobacco is charged about the same as lard in pails, and cotton about the same as large packages of provisions; while the highest rates quoted are for butter and cheese.

The original quotations from which Tables 4, 5, and 6 were compiled are expressed in different units for different articles and different destinations, and as far as practicable have been reduced to a basis of cents per 100 pounds for the sake of uniformity. The figures as given in these three tables are based upon a mean of the highest and lowest rates in each of four months—January, April, July, and Octo-

ber—in each year named. Owing to the few changes in quotations for most articles in the course of several months it is believed that the omission of the other eight months has not caused any serious error in the averages as computed.

TABLE 4.—*Mean annual quotations of ocean freight rates on various farm products from BOSTON to eleven European ports, 1903–1906.*<sup>a</sup>

[Cents per 100 pounds.]

Article and calendar year.	From Boston to—										Mean rate to ports named. <sup>b</sup>	
	Antwerp.	Copenhagen.	Genoa.	Glasgow.	Hamburg.	Hull.	Liverpool.	London.	Manchester.	Naples.		Rotterdam.
Apples: <sup>c</sup>												
1903.....	50.4	100.8	63.0	63.0	75.0	.....	50.4	50.4	50.4	63.0	49.4	58.1
1904.....	50.4	.....	63.0	63.0	75.0	.....	50.4	50.4	50.4	63.0	50.4	58.2
1905.....	.....	.....	63.0	63.0	75.0	54.6	50.4	50.4	50.4	63.0	47.2	57.8
1906.....	63.0	.....	63.0	63.0	75.0	56.7	50.4	63.0	50.4	63.0	44.9	59.1
Butter:												
1903.....	33.0	.....	24.6	33.8	28.8	.....	22.5	27.0	24.6	24.6	24.7	26.3
1904.....	28.1	.....	27.2	33.8	48.0	.....	19.0	27.8	19.0	27.2	24.2	28.3
1905.....	.....	.....	23.2	33.8	48.0	.....	21.1	28.1	22.5	23.2	22.5	27.8
1906.....	34.5	.....	27.8	33.8	48.0	.....	23.2	31.6	23.2	27.8	25.0	30.0
Cheese:												
1903.....	31.7	.....	24.6	28.1	26.0	.....	19.7	22.5	21.8	23.9	25.0	24.0
1904.....	22.5	.....	27.2	28.1	48.0	.....	14.1	22.5	15.1	27.2	24.2	25.8
1905.....	.....	.....	23.2	28.1	48.0	.....	17.2	22.5	16.9	23.2	22.5	25.2
1906.....	28.8	.....	26.0	28.1	48.0	.....	17.6	26.0	17.6	26.0	25.0	26.8
Cotton:												
1903.....	16.4	.....	16.6	.....	20.6	.....	10.9	.....	14.0	16.0	20.0	16.4
1904.....	15.0	.....	16.8	.....	22.8	.....	9.1	.....	11.0	16.8	20.0	16.1
1905.....	.....	.....	15.0	.....	25.9	.....	11.5	.....	12.4	15.0	20.0	16.6
1906.....	23.3	.....	18.2	.....	24.6	.....	13.2	.....	15.4	18.2	20.0	18.3
Flour (in sacks):												
1903.....	.....	10.7	11.0	8.0	10.0	12.7	8.4	8.5	8.4	11.0	8.0	9.7
1904.....	8.4	10.2	10.8	6.3	10.0	12.3	6.3	7.6	6.7	10.8	7.7	8.9
1905.....	.....	13.0	11.2	8.4	12.8	13.8	7.4	9.5	7.8	11.2	11.5	10.7
1906.....	11.7	13.3	11.2	9.2	13.8	13.9	7.5	9.2	8.0	11.2	10.0	10.7
Grain: <sup>d</sup>												
1903.....	6.6	11.2	7.9	6.8	9.0	9.1	5.2	7.0	5.4	7.9	9.4	7.9
1904.....	5.2	10.6	7.6	5.7	8.2	7.9	3.7	4.4	4.0	7.6	6.3	6.6
1905.....	.....	10.7	7.9	7.0	11.9	9.2	6.1	8.3	6.2	7.9	5.6	8.1
1906.....	7.0	10.2	12.8	6.9	11.3	9.8	6.1	7.5	6.6	12.8	5.9	9.0
Hay:												
1903.....	14.8	.....	25.3	22.5	.....	.....	11.5	16.9	14.0	25.3	22.5	19.2
1904.....	16.9	.....	27.2	19.7	.....	.....	10.0	14.1	10.8	27.2	22.5	18.2
1905.....	.....	.....	28.1	21.1	.....	.....	13.7	19.4	15.2	28.1	.....	20.9
1906.....	16.9	.....	28.1	23.9	.....	.....	16.5	19.4	18.0	28.1	.....	22.3
Lard (in pails):												
1903.....	23.7	22.5	21.1	22.5	19.1	22.5	17.6	19.7	18.7	20.4	19.7	20.4
1904.....	19.7	21.1	19.7	21.1	20.0	20.8	11.6	19.7	14.0	19.7	19.7	18.7
1905.....	.....	25.4	20.4	22.5	22.8	22.8	17.2	20.0	16.9	20.4	23.0	21.1
1906.....	22.8	26.6	25.3	22.8	27.2	25.3	17.6	22.5	17.6	25.3	25.0	23.5
Oil cake:												
1903.....	8.3	10.7	11.2	8.0	10.0	11.2	8.3	8.4	8.3	11.2	8.1	9.5
1904.....	8.4	10.2	11.2	6.4	10.0	11.2	6.3	7.6	6.6	11.2	7.7	8.8
1905.....	.....	13.2	11.2	8.1	12.8	11.6	7.4	9.5	7.8	11.2	11.5	10.4
1906.....	11.5	13.7	11.2	9.2	13.8	11.6	7.5	9.4	8.0	11.2	10.0	10.6
Provisions: <sup>e</sup>												
1903.....	18.0	19.7	16.9	16.9	16.6	16.9	11.9	14.1	13.0	16.9	14.1	15.7
1904.....	16.9	18.3	16.9	15.5	17.0	15.2	7.4	14.1	8.4	16.9	14.1	14.4
1905.....	.....	23.4	17.2	16.9	19.8	17.2	11.6	14.4	11.6	17.2	17.4	16.7
1906.....	19.4	23.9	19.7	17.2	22.8	19.7	11.9	16.9	11.9	19.7	19.4	18.3
Tobacco:												
1903.....	18.2	.....	.....	25.0	25.0	.....	14.6	20.7	17.5	.....	24.0	21.1
1904.....	18.0	.....	.....	25.0	24.4	.....	13.8	21.9	14.6	.....	24.7	20.7
1905.....	.....	.....	.....	25.0	29.4	.....	15.4	20.6	15.5	.....	26.0	22.0
1906.....	30.0	.....	.....	25.0	31.9	.....	15.5	20.6	16.2	.....	26.0	22.5

<sup>a</sup> Compiled from circulars issued by the Boston and Maine Railroad Company.

<sup>b</sup> In computing the averages in this column the following figures were not used, on account of the lack of corresponding data for all the four years (1903–1906): Antwerp, all articles; Copenhagen, apples; Hull, apples; and Rotterdam, hay.

<sup>c</sup> Cents per barrel.

<sup>d</sup> Wheat, corn, and rye.

<sup>e</sup> Except lard in pails.



## QUOTATIONS FROM NEW YORK TO EUROPEAN PORTS.

Of the 21 articles mentioned in Table 5 the mean quoted rate on each of 13 from New York to the ports named in the table for each year from 1903 to 1905 was less than 20 cents per 100 pounds. The mean rate on only two of the other articles—butter and cheese—exceeded 35 cents per 100 pounds, and the rates quoted for those two products averaged from 35 to 40 cents per 100 pounds during 1903–1906.

The lowest rates quoted in the table were for flour and oil cake and averaged 10 or 12 cents per 100 pounds. The European ports to which the lowest rates prevailed on the articles mentioned in Table 5 were Liverpool, Manchester, and London. To Marseille, the only Mediterranean port mentioned in the table, rates were generally quoted higher than to ports in northwestern Europe, except on cottonseed oil. The mean rates quoted on this article from New York to Marseille were lower than to any other of the eleven ports mentioned in the table except Liverpool, Manchester, and London.

TABLE 5.—Mean annual quotations of ocean freight rates on various farm products from **NEW YORK** to eleven European ports, 1903–1906.<sup>a</sup>

[In cents per 100 pounds, unless otherwise stated.]

Article and calendar year.	From New York to—										Mean rate to ports named.	
	Antwerp.	Bremen.	Copenhagen.	Hamburg.	Havre.	Leith.	Liverpool.	London.	Manchester.	Marseille.		Rotterdam.
Apples, fresh (in barrels): <sup>b</sup>												
1903.....	94.5	75.0	100.0	75.0	62.5	.....	61.4	52.0	63.0	.....	82.5	74.0
1904.....	85.0	75.0	75.0	75.0	75.0	.....	63.0	63.0	63.0	.....	81.2	72.8
1905.....	75.6	75.0	75.0	75.0	75.0	.....	63.0	63.0	63.0	.....	75.0	71.1
1906.....	75.6	75.0	75.0	75.0	75.0	.....	63.0	63.0	63.0	.....	75.0	71.1
Apples, dried (in boxes):												
1903.....	c22.5	c22.7	c25.3	c22.2	c23.1	c25.3	c16.9	c16.9	c16.9	.....	c25.0	c21.7
1904.....	22.5	23.6	23.2	24.0	25.0	25.3	17.6	16.9	16.9	.....	25.0	22.0
1905.....	22.5	22.5	25.2	24.2	25.0	24.6	17.6	18.3	17.6	.....	25.0	22.2
1906.....	23.1	24.1	25.0	26.0	24.4	22.5	19.7	20.4	19.7	.....	25.0	23.0
Bacon:												
1903.....	19.7	16.8	19.7	16.5	18.2	17.2	12.6	14.1	12.7	16.9	15.2	16.3
1904.....	18.3	17.2	18.3	17.2	17.5	18.3	9.8	12.7	9.8	18.3	15.0	15.7
1905.....	17.2	18.5	22.5	20.8	15.6	19.7	11.6 <sup>a</sup>	14.4	11.2	22.5	17.5	17.4
1906.....	19.4	20.8	23.2	22.0	24.4	22.5	11.9	17.6	11.9	27.4	21.0	20.2
Beef, salted (in tierces):												
1903.....	d21.9	16.5	21.1	16.5	17.8	d18.1	d13.2	d15.1	d12.9	16.9	15.2	16.8
1904.....	d19.6	17.2	18.3	17.2	17.5	d18.8	d10.6	d15.1	d10.6	18.3	15.0	16.2
1905.....	d18.1	18.5	22.5	20.8	15.6	d21.6	d12.5	d15.5	d12.1	22.5	17.8	18.0
1906.....	c20.4	20.8	23.6	22.0	28.1	d24.1	d12.9	d18.8	d12.9	27.4	21.0	21.1
Butter:												
1903.....	39.4	58.8	56.2	47.1	45.0	28.1	23.9	28.1	.....	33.8	40.0	40.0 <sup>a</sup>
1904.....	39.4	57.3	51.9	47.0	45.0	28.1	25.0	28.1	.....	33.8	40.0	39.6
1905.....	39.4	58.8	39.4	47.1	45.0	28.1	27.3	28.1	.....	33.8	41.2	38.8
1906.....	39.4	47.0	54.4	47.0	45.0	28.1	28.8	31.6	.....	35.2	45.0	40.2
Cheese:												
1903.....	33.8	47.1	56.2	47.1	45.0	22.5	22.8	22.5	21.4	33.8	40.0	35.7
1904.....	33.8	47.0	52.0	47.0	45.0	22.5	22.5	22.5	22.5	33.8	40.0	35.3
1905.....	33.8	47.1	50.6	47.1	45.0	22.5	22.5	22.5	22.5	33.8	41.2	35.3
1906.....	33.8	47.0	50.6	47.0	45.0	26.7	23.2	26.0	20.0	35.2	45.0	36.3

<sup>a</sup> Compiled from circulars issued by the following ship brokers and forwarding agents at New York: Lunham & Moore, The Vincent Loeser Co., and Lambert & Barrows.

<sup>b</sup> Per barrel.

<sup>c</sup> Quotations given originally on a basis of measurement; reduced to cents per 100 pounds by allowing 2,240 pounds to 40 cubic feet.

<sup>d</sup> Quotations given originally by the tierce; reduced to cents per 100 pounds by allowing 418 pounds as the average gross weight of 1 tierce of beef.

TABLE 5.—Mean annual quotations of ocean freight rates on various farm products from  
*NEW YORK* to eleven European ports, 1903–1906—Continued.

	From New York to—											to
Article and calendar year.	Antwerp.	Bremen.	Copenhagen.	Hamburg.	Havre.	Leith.	Liverpool.	London.	Manchester.	Marseille.	Rotterdam.	Mean rate to ports named.
Cotton, compressed:												
1903.....	15.4	23.3	.....	19.4	27.0	.....	14.8	.....	14.1	.....	.....	17.8
1904.....	15.0	21.9	.....	22.2	22.8	.....	13.7	.....	13.8	.....	.....	18.3
1905.....	17.0	21.2	.....	24.7	21.4	.....	16.6	.....	16.4	.....	.....	19.2
1906.....	21.1	21.3	.....	24.9	28.2	.....	17.0	.....	17.4	.....	.....	21.4
Flour (in sacks):												
1903.....	11.2	12.0	11.4	11.8	10.3	10.8	8.4	8.5	8.5	9.6	10.0	10.2
1904.....	9.8	10.5	9.5	11.5	11.6	12.2	6.8	7.4	7.7	11.9	8.2	9.7
1905.....	10.2	12.6	12.8	12.8	9.9	16.0	8.4	10.0	8.4	14.8	10.9	11.5
1906.....	11.3	13.5	13.1	12.8	13.4	14.4	8.9	9.0	9.2	14.8	11.6	11.9
Glucose and grape sugar:												
1903.....	14.1	16.0	11.2	14.0	15.0	13.1	8.4	9.3	9.0	16.9	15.0	12.9
1904.....	12.6	16.0	11.2	14.2	15.0	14.8	8.4	8.0	8.6	16.9	12.0	12.5
1905.....	11.9	16.0	16.9	16.2	15.0	15.8	8.9	10.0	8.4	16.9	16.5	13.9
1906.....	13.4	16.0	16.2	16.0	15.0	14.5	9.4	10.6	9.9	16.2	18.0	14.1
Hay:												
1903.....	.....	.....	.....	.....	30.0	19.8	15.5	18.0	17.2	.....	40.0	23.4
1904.....	.....	.....	.....	.....	30.0	24.2	14.8	16.9	20.4	.....	40.0	24.4
1905.....	.....	.....	.....	.....	30.0	22.5	11.2	16.9	16.9	.....	40.0	22.9
1906.....	.....	.....	.....	.....	.....	25.3	15.8	16.5	19.7	.....	.....	19.3
Istle:												
1903.....	16.2	.....	25.3	.....	20.3	.....	16.9	19.7	19.7	45.5	28.8	24.1
1904.....	15.5	27.0	28.1	23.5	20.0	.....	16.9	19.7	19.7	33.7	23.3	22.7
1905.....	18.3	.....	28.1	.....	20.0	.....	16.9	19.7	19.7	25.3	18.5	20.8
1906.....	20.4	27.0	28.1	29.4	25.0	.....	15.5	18.3	16.9	35.2	20.0	23.6
Lard (in tierces):												
1903.....	19.4	16.8	19.7	16.5	17.8	17.2	12.3	14.1	11.9	16.9	15.2	16.2
1904.....	15.5	18.8	18.3	19.8	17.5	18.3	9.8	14.1	9.8	18.3	15.0	15.9
1905.....	15.2	18.5	22.5	20.8	15.6	19.7	11.6	14.4	11.2	22.5	17.8	17.3
1906.....	16.5	20.8	23.2	22.0	25.0	22.5	12.0	17.6	11.9	28.8	21.0	20.1
Lard (in small packages):												
1903.....	22.2	16.0	22.5	18.2	22.8	22.8	18.0	19.7	17.2	19.7	20.2	19.9
1904.....	18.3	22.8	20.4	22.8	22.5	23.2	15.5	19.7	15.5	21.1	20.0	20.2
1905.....	17.2	21.5	25.3	22.8	18.8	22.5	16.9	20.0	16.9	25.3	22.8	20.9
1906.....	20.5	23.8	27.8	25.0	28.8	26.7	17.2	23.2	16.9	32.3	27.2	24.5
Meats, canned:												
1903.....	19.7	16.5	19.7	16.5	18.1	17.2	12.3	14.1	11.9	16.9	15.2	16.2
1904.....	18.3	17.2	18.3	17.2	17.2	18.3	9.8	14.1	9.8	18.3	15.0	15.8
1905.....	16.9	18.5	22.5	20.8	15.6	19.7	11.6	14.4	11.2	22.5	17.8	17.4
1906.....	19.0	20.8	23.2	22.0	24.4	22.5	11.9	17.6	11.9	27.4	21.0	20.2
Oil, cotton-seed:												
1903.....	13.4	16.5	19.7	16.5	17.8	16.1	11.1	13.4	14.7	13.4	15.0	15.2
1904.....	13.4	17.2	18.3	17.2	17.5	16.8	9.4	13.4	13.8	13.4	15.0	15.0
1905.....	14.1	18.5	22.5	20.8	15.0	18.8	10.7	13.2	13.4	16.1	17.8	16.4
1906.....	15.4	20.8	23.4	22.0	24.6	21.4	11.4	16.1	15.1	18.3	21.0	19.0
Oil cake:												
1903.....	8.4	12.0	11.2	11.8	10.6	10.4	8.2	8.7	8.4	9.0	9.9	9.9
1904.....	7.9	11.2	10.4	11.5	11.6	12.2	7.4	5.6	8.4	10.3	8.2	9.5
1905.....	9.4	12.6	12.8	12.8	10.0	12.3	7.8	10.3	8.0	14.8	11.2	11.1
1906.....	11.3	12.8	13.1	12.8	13.0	14.1	8.4	9.4	9.6	14.8	11.2	11.9
Pork, salt (in barrels):												
1903.....	32.1	16.2	21.1	16.2	17.8	17.8	16.0	16.3	13.8	16.9	15.2	18.1
1904.....	24.9	17.2	18.3	17.2	17.5	17.8	10.8	19.7	11.0	17.8	15.0	17.0
1905.....	17.8	18.5	28.1	20.0	15.6	17.8	7.9	19.2	11.8	22.5	15.6	17.7
1906.....	19.2	21.0	23.6	22.0	23.4	21.7	12.8	19.7	12.3	27.4	21.0	20.4
Seed, clover:												
1903.....	14.1	14.8	19.7	16.5	19.7	16.9	11.2	12.7	16.9	21.8	15.0	16.3
1904.....	14.1	20.0	17.6	20.0	17.5	16.9	11.2	12.7	16.9	16.9	15.0	16.3
1905.....	16.9	20.0	21.8	20.0	17.5	15.8	11.2	12.7	16.9	16.9	18.0	17.1
1906.....	19.7	20.2	23.2	22.0	26.2	19.0	14.1	14.8	14.8	26.2	21.0	20.1
Seed, timothy:												
1903.....	19.4	17.9	25.0	19.5	25.0	20.4	14.1	18.1	19.4	25.3	20.2	20.4
1904.....	16.9	24.0	20.4	23.0	25.0	19.7	14.1	16.9	16.9	25.3	20.0	20.2
1905.....	16.9	25.3	23.9	23.0	27.5	21.1	14.1	16.9	16.9	25.3	19.8	21.0
1906.....	22.5	23.2	26.0	25.0	33.8	25.2	16.9	17.6	16.9	35.2	24.0	24.2

<sup>a</sup> Mean of quotations for twelve months, as given in the New York Journal of Commerce and Commercial Bulletin.

<sup>b</sup> Quotations given originally by the barrel; reduced to cents per 100 pounds by allowing 470 pounds as the average gross weight of a barrel of cotton-seed oil.

<sup>c</sup> Quotations given originally by the barrel; reduced to cents per 100 pounds by allowing 320 pounds as the average gross weight of pork in a barrel.

TABLE 5.—*Mean annual quotations of ocean freight rates on various farm products from NEW YORK to eleven European ports, 1903-1906—Continued.*

Article and calendar year.	From NewYork to—										Mean rate to ports named.	
	Antwerp.	Bremen.	Copenhagen.	Hamburg.	Havre.	Leith.	Liverpool.	London.	Manchester.	Marseille.		Rotterdam.
Sirup:												
1903.....	14.1	16.0	12.6	14.0	15.0	13.0	8.4	8.8	9.1	16.9	13.9	12.9
1904.....	12.6	16.0	11.2	14.2	15.0	15.0	7.7	8.0	8.6	16.9	14.2	12.7
1905.....	12.7	16.0	16.9	16.2	15.0	15.8	7.7	10.0	8.4	16.9	16.5	13.8
1906.....	13.4	16.0	16.5	15.5	15.0	14.5	9.4	10.8	9.9	16.9	18.0	14.2
Tallow:												
1903.....	14.1	15.2	19.7	16.5	18.1	17.2	12.3	14.1	12.3	11.2	15.2	15.1
1904.....	13.1	17.2	19.0	17.2	19.4	19.7	9.7	14.1	9.8	12.6	15.0	15.2
1905.....	12.6	18.5	22.6	20.8	15.6	19.7	11.6	14.4	11.2	17.6	17.8	16.5
1906.....	16.9	20.8	23.6	22.0	24.4	22.5	12.0	17.6	12.0	19.7	21.0	19.3

## QUOTATIONS FROM BALTIMORE.

The prevailing rates on all but two of the farm products mentioned in Table 6 were less than 25 cents per 100 pounds in 1903-1906. The mean rate on feathers to eleven ports for each of these four years was about 60 cents per 100 pounds, and on blue-grass seed the corresponding rates were from 27 to 30 cents per 100 pounds. No rates for butter or cheese were quoted in the circulars from which this table was compiled.

TABLE 6.—*Mean annual quotations of ocean freight rates on various farm products from BALTIMORE to eleven European ports, 1903-1906.<sup>a</sup>*

[Cents per 100 pounds.]

Article and calendar year.	From Baltimore to—										Mean rate to ports named.	
	Amsterdam.	Antwerp.	Belfast.	Bremen.	Dublin.	Hamburg.	Havre.	Leith.	Liverpool.	London.		Rotterdam.
Apples, dried (in boxes):												
1903.....	20.6	22.0	19.7	19.0	20.8	20.0	25.0	23.2	20.6	21.8	19.0	21.1
1904.....	20.0	22.0	18.3	21.2	18.8	21.0	25.0	20.8	25.0	20.0	18.0	20.9
1905.....	20.4	22.4	17.4	21.0	17.7	22.8	25.0	19.7	25.0	19.0	18.4	20.8
1906.....	23.0	25.0	19.7	24.0	20.8	26.1	25.0	19.7	25.0	21.4	21.0	22.8
Bran, compressed (in bags):												
1903.....	19.8	18.0	16.5	13.2	17.5	13.2	22.0	18.8	16.0	14.2	18.0	17.0
1904.....	18.0	17.0	16.4	12.0	17.0	12.8	22.0	16.2	14.5	13.6	16.0	16.0
1905.....	18.9	18.8	15.3	13.5	15.6	13.7	22.0	16.1	17.8	14.3	16.9	16.6
1906.....	20.5	19.5	16.5	13.5	17.5	14.8	26.9	17.2	19.0	15.6	18.5	18.1
Cotton, compressed:												
1903.....	25.4	19.5	.....	20.5	.....	18.5	24.8	.....	14.6	20.0	25.4	21.1
1904.....	25.6	19.0	.....	20.2	.....	19.1	27.0	.....	15.5	20.0	25.6	21.5
1905.....	27.5	18.6	.....	18.8	.....	25.0	22.5	.....	15.8	20.0	27.5	22.0
1906.....	27.5	22.8	.....	21.0	.....	23.1	24.1	.....	18.5	28.8	27.5	24.2
Cotton-seed meal:												
1903.....	12.6	9.8	15.0	10.9	15.7	11.2	13.0	13.7	9.9	12.8	11.0	12.3
1904.....	12.2	8.7	12.5	10.0	12.5	11.4	13.4	12.1	6.4	8.8	10.2	10.7
1905.....	13.5	10.8	14.1	12.1	14.3	14.0	13.8	13.6	9.3	12.7	11.5	12.7
1906.....	14.8	11.6	14.3	13.8	14.8	14.8	14.4	13.4	9.1	12.4	12.8	13.3

<sup>a</sup>Compiled from circulars issued by the Baltimore and Ohio Railroad Company.



TABLE 6.—Mean annual quotations of ocean freight rates on various farm products from *BALTIMORE* to eleven European ports, 1903-1906—Continued.

Article and calendar year.	From Baltimore to—											Mean rate to ports named.
	Amsterdam.	Antwerp.	Belfast.	Bremen.	Dublin.	Hamburg.	Havre.	Leith.	Liverpool.	London.	Rotterdam.	
Feathers, compressed (in bales):												
1903.....	75.0	60.0	56.3	35.0	61.9	56.3	70.6	67.5	60.0	50.6	65.0	59.7
1904.....	75.0	60.0	56.3	35.0	61.9	50.0	75.0	67.5	60.0	50.6	65.0	59.7
1905.....	75.0	60.0	56.3	35.0	61.9	50.0	75.0	67.5	60.0	50.6	65.0	59.7
1906.....	75.0	60.0	56.2	35.0	63.0	52.6	75.0	67.5	60.0	50.6	65.0	60.0
Flour (in bags):												
1903.....	11.7	9.8	14.0	11.0	14.5	10.8	13.0	12.4	9.9	11.8	10.7	11.8
1904.....	10.6	8.7	11.4	10.0	11.4	10.5	13.4	11.1	6.4	7.8	9.6	10.1
1905.....	12.6	10.6	13.0	12.5	13.1	12.9	13.6	12.6	9.4	10.0	11.5	12.0
1906.....	12.9	11.7	13.3	13.5	13.8	13.8	14.4	12.4	8.9	10.6	11.6	12.4
Glucose:												
1903.....	12.5	10.0	.....	16.5	.....	.....	13.2	.....	10.3	.....	10.8	12.2
1904.....	11.9	9.0	.....	17.5	.....	.....	13.6	.....	6.8	.....	10.1	11.5
1905.....	13.5	11.1	.....	17.5	.....	.....	14.1	.....	9.9	.....	11.5	12.9
1906.....	15.5	12.5	.....	16.4	.....	.....	14.9	.....	9.6	.....	13.5	13.7
Hair, compressed (in bales):												
1903.....	.....	25.0	22.5	20.5	25.3	20.0	31.2	25.3	23.2	22.5	.....	23.9
1904.....	28.2	22.5	21.1	20.0	22.5	21.5	32.5	22.5	22.5	21.1	26.2	22.9
1905.....	32.0	25.0	19.7	20.0	20.0	26.5	30.0	19.7	25.0	19.7	30.0	22.8
1906.....	31.0	28.0	22.5	21.9	23.6	30.0	35.0	22.5	25.8	22.5	29.0	25.8
Meats, canned:												
1903.....	14.6	14.1	16.9	16.8	18.0	17.0	17.2	19.7	13.4	16.0	12.9	16.1
1904.....	14.0	15.0	15.0	17.5	15.6	18.2	17.0	17.0	8.4	15.4	12.0	15.0
1905.....	17.9	16.2	14.7	19.0	15.1	20.0	18.0	15.5	13.8	16.2	15.9	16.6
1906.....	18.8	16.9	15.5	20.6	16.6	23.0	18.1	16.9	14.4	18.6	17.0	17.9
Oil cake:												
1903.....	12.5	9.5	13.1	.....	14.5	10.8	13.0	10.7	9.9	11.6	11.0	11.7
1904.....	11.6	8.7	11.4	10.0	11.4	10.5	13.4	11.1	6.4	7.8	9.8	10.2
1905.....	13.6	10.6	13.0	12.5	13.2	12.8	13.6	12.6	9.4	10.2	11.6	12.1
1906.....	13.0	11.6	13.3	13.5	13.8	13.8	14.4	12.4	9.2	10.4	11.8	12.5
Oats, rolled (in bags):												
1903.....	18.8	18.0	16.9	15.0	18.0	17.0	20.0	19.7	13.0	16.0	16.8	17.2
1904.....	16.5	18.0	15.5	15.0	16.0	18.2	20.0	17.2	12.6	15.8	14.5	16.3
1905.....	17.9	14.9	15.5	16.2	15.8	20.8	20.0	15.9	12.4	16.2	15.9	16.5
1906.....	18.8	17.6	16.9	17.8	18.0	18.5	19.2	17.2	15.8	15.6	17.2	17.5
Oats, rolled (in cases):												
1903.....	18.2	20.0	19.7	15.0	20.8	17.0	25.0	22.5	15.0	21.6	16.2	19.2
1904.....	16.2	20.0	18.3	15.0	18.8	18.2	25.0	20.0	15.0	21.4	14.2	18.4
1905.....	17.9	18.9	18.3	16.2	18.8	21.0	25.0	18.7	17.2	21.8	16.1	19.1
1906.....	18.8	20.0	18.8	17.8	20.4	23.2	15.5	19.6	18.5	20.1	17.2	19.1
Provisions—lard, oleo oil, and tallow (large packages):												
1903.....	14.6	14.1	16.9	16.8	18.0	17.5	17.4	19.7	13.4	16.0	12.9	16.1
1904.....	14.0	15.0	15.5	17.5	16.0	18.2	17.1	18.0	8.4	15.8	12.0	15.2
1905.....	17.9	16.2	14.7	19.5	15.1	19.8	18.0	15.9	13.6	15.7	15.9	16.6
1906.....	18.8	16.9	15.5	21.0	16.6	23.0	19.8	16.9	13.8	18.6	16.8	18.0
Provisions—lard and tallow in tubs and pails (small packages):												
1903.....	19.4	17.1	19.7	19.8	20.8	20.5	22.4	22.5	19.1	21.6	17.6	20.0
1904.....	19.0	18.0	18.3	20.5	18.8	21.2	22.1	20.0	13.0	21.4	17.0	19.0
1905.....	22.9	21.8	17.5	22.5	17.9	22.8	23.0	18.7	19.2	21.8	20.9	20.8
1906.....	23.8	22.5	19.7	24.0	20.8	26.0	25.0	21.1	19.5	24.2	21.8	22.6
Quick malt:												
1903.....	23.2	18.0	22.0	14.2	24.0	20.0	25.0	27.0	13.2	20.8	21.2	20.8
1904.....	21.7	18.0	21.8	12.0	22.8	20.0	25.0	24.2	13.1	19.6	19.7	19.8
1905.....	19.4	21.5	21.5	15.2	22.1	20.6	25.0	21.0	19.0	20.8	17.4	20.3
1906.....	21.8	22.5	21.8	15.0	23.2	17.2	25.0	20.4	21.0	21.0	19.8	20.8
Seed, clover:												
1903.....	15.2	17.0	16.9	16.8	18.0	17.5	20.0	18.3	15.0	16.0	13.2	16.7
1904.....	13.4	15.4	15.5	17.2	16.0	20.0	20.0	16.9	11.2	15.8	11.4	15.7
1905.....	16.8	16.1	15.9	19.5	16.4	17.5	18.8	15.8	15.0	15.6	14.8	16.6
1906.....	18.8	18.0	16.9	21.0	18.0	22.9	20.0	16.7	16.0	18.6	16.8	18.5
Seed, blue grass:												
1903.....	30.8	25.0	31.1	.....	31.4	32.2	30.0	33.8	22.0	30.2	28.8	29.5
1904.....	28.4	20.8	28.8	.....	28.0	34.1	30.0	30.4	18.6	27.6	26.4	27.3
1905.....	33.0	22.4	27.8	.....	28.1	25.8	28.8	27.6	21.5	28.2	31.0	27.4
1906.....	31.5	28.0	29.5	.....	30.7	33.9	30.0	29.2	20.5	32.4	29.5	29.4

TABLE 6.—*Mean annual quotations of ocean freight rates on various farm products from BALTIMORE to eleven European ports, 1903-1906—Continued.*

Article and calendar year.	From Baltimore to—										Mean rate to ports named.	
	Amsterdam.	Antwerp.	Belfast.	Bremen.	Dublin.	Hamburg.	Havre.	Leith.	Liverpool.	London.		Rotterdam.
Starch (in bags):												
1903.....	12.5	9.9	14.1	11.8	14.8	10.8	13.0	13.6	9.9	12.2	10.8	12.1
1904.....	12.2	8.6	11.4	12.0	11.4	10.5	13.4	11.1	6.4	7.8	10.1	10.4
1905.....	13.5	10.6	13.0	13.0	13.2	12.9	13.6	12.6	9.4	11.7	11.5	12.3
1906.....	13.5	11.6	13.3	13.5	13.8	14.1	14.5	12.4	9.1	10.6	12.0	12.6
Starch (in cases):												
1903.....	14.4	15.4	14.5	11.8	15.5	11.0	19.0	16.4	17.0	14.0	12.6	15.0
1904.....	12.6	15.6	.....	12.0	.....	.....	17.5	.....	11.8	.....	11.6	13.5
1905.....	15.4	16.9	.....	13.0	.....	.....	19.9	.....	15.9	.....	13.4	15.8
1906.....	17.8	17.5	.....	14.8	.....	.....	20.6	.....	16.8	.....	15.8	17.2
Tobacco, leaf (in hogsheads):												
1903.....	24.5	20.0	26.8	30.0	28.1	20.0	30.0	29.5	19.0	23.5	22.5	24.9
1904.....	25.0	16.5	26.0	25.0	27.0	20.0	30.0	26.8	18.0	23.0	25.0	23.8
1905.....	25.0	18.1	28.0	25.0	28.1	21.2	30.0	27.0	17.5	23.0	25.0	24.4
1906.....	25.0	24.0	30.0	25.0	30.0	26.2	30.0	27.0	19.5	25.0	25.0	26.1

## BUSINESS METHODS.

## SERVICES OF THE SUBMARINE TELEGRAPH.

In a study of ocean freight charges, it is interesting to note the service to commerce performed by the submarine telegraph. This invention puts a shipowner in touch with his vessel in practically every port in the world. He is able to learn to what ports he should send his orders, and at what ones business may be found. The ship may be on its way to Australia with a cargo of general merchandise when the owner learns that he can secure a contract to carry sugar to New York from Java. He makes the contract for this business and cables his ship at its Australian destination, with orders to proceed, after the present cargo is discharged, to Java for the sugar. The facilities for keeping informed of the movements of vessels and of prospects for traffic help to make the earnings of a tramp ship more regular and to prevent, to some degree, extreme sudden changes in ocean freight rates.

## TWO CLASSES OF OCEAN CARRIERS.

While the direct interest of the producer may be in the rate of freight he pays, rather than in the cost to the carrier of performing the service, the latter and the elements of which it is composed determine the lowest level of the rates paid by the shipper during any considerable period of time. Economies in the construction of ships and piers, improvements in harbors, cheaper methods of loading and unloading cargoes, a saving of labor in operating ships, all have an important bearing upon the marketing of exported products.

There are two main classes of ocean vessels—liners and tramps. The first class consists of vessels belonging to a regular line—that is, a group of vessels plying over the same route, voyage after voyage, and having more or less regular times of sailing. Vessels of the second class, commonly called tramps, have no regular routes nor times of sailing, but go from port to port seeking business, usually for a single voyage at a time.

#### LINE TRAFFIC.

It is not easy to define just what constitutes a line of steamers. Some lines have vessels making regular sailings from each terminal point as often as two or three times a week. Other lines make but one or two voyages each month, and still others furnish a vessel only whenever traffic enough is offered. These last-mentioned “lines,” those which have no regular dates of sailing, are not always easy to distinguish from groups of ordinary tramp ships, especially when they are composed of vessels chartered each for a single voyage. These lines of irregular sailing dates, however, may have regular routes, which tramps do not have, although the vessels used may be chartered each for a single voyage or for only one round trip at a time. The number of vessels in any one line may change with the volume of traffic, for some steamship companies charter additional vessels to care for increased trade, and renew the charters or obtain other ships as long as the increased service is justified. After the expiration of the charters, these hired vessels return to their former occupations, perhaps in the service of some other line, or they may engage in business as tramps. So a liner may be a tramp part of the year, or a tramp may serve as a liner for a season.

In addition to regularity in the time of sailing and of the routes traversed, another distinctive feature of line traffic is the large size of some of the vessels and consequently the large cargoes carried. On April 1, 1907, a liner cleared from Seattle for Japan with a cargo valued at \$1,281,602. It included 11,483 bales of cotton worth \$676,155; 1,221 cases of cotton goods valued at \$270,103; 18,801 barrels of flour worth \$58,573; 640 hogsheads of leaf tobacco worth \$110,091, and 2 locomotives valued at \$5,840. In addition to which there were consignments of machinery, hardware, crockery, clay pigeons, lumber, clothing, hats, hair tonic, tea, lead, household goods, butter, condensed milk, dynamos, roofing paper, emery wheels, bones, leather, books, photographs, typewriters, toilet water, car wheels, and advertising matter.

#### CONDITIONS AT GULF PORTS.

During the shipping season the traffic in cotton at the southern ports of the United States is far too great for the liners to handle and

numbers of tramps lend aid in carrying this product abroad. Liners in this traffic are generally able to obtain much higher rates than tramps. The rates charged by first-class liners on cotton from Galveston to European ports in 1906-7 was 3 cents per 100 pounds more than the rates charged by tramps, 2 cents more than the rates charged by third-class liners, and 1 cent more than the rates charged by second-class liners. It may be noticed in passing that steamship lines between the cotton ports of the United States and those of Europe are seldom engaged in passenger service and their dates of sailing are, therefore, more easily postponed whenever it becomes necessary to wait several hours or even days for the completion of a cargo.

The passenger lines plying between the North Atlantic ports of the United States and Europe sometimes offer extremely low rates to shippers and succeed in attracting cargoes from South Atlantic and Gulf ports in coastwise vessels.

Coastwise steamship lines bring considerable quantities of cotton to New York from Southern ports for shipment to Europe. One advantage of this indirect route is the saving of time. The fast coastwise liners take about five days to reach New York from Galveston and New Orleans, and the trans-Atlantic liners from New York require for their voyage about nine days longer, so that the total time required to ship cotton from Galveston to Liverpool by coastwise steamers to New York may not exceed two weeks, while it sometimes takes a freight steamer more than three weeks to make the voyage from Galveston or New Orleans direct to Liverpool.

#### CHARTER TRAFFIC.

The fact that farm products are ready for shipment in a given country in large quantities only at certain seasons of the year makes the tramp ship practically a necessity. The large quantities of wheat gathered soon after harvest at the seaboard in various countries for shipment to Europe could not, as a rule, be handled by the steamship lines plying from these regions, so it is necessary for some independent vessels to assist in handling the business. The same is true to a marked degree in cotton shipments from the United States, sugar from Java, jute from India, and rice from India and Cochin China. The tramp ship, in some respects, is not to be regarded as a competitor of steamship lines. Each class of carriers seems to have certain characteristic services to perform. The liners seek the traffic which is more regular in amount and which tends to move over a fixed route. The tramp takes the other business. The tramp makes long voyages, often lasting one or more years. The record of a year's voyages of each of two tramps will serve to illustrate the traffic belonging to this class of vessels. On April 8, 1906, one of these ships left London with goods for Colombo, Singapore, and certain



ports in Japan. Going thence to Java a cargo of sugar was loaded for New York. From New York the ship took merchandise for twenty-six ports on the west coast of South America. Thence, with a cargo of nitrate of soda, the ship sailed for Baltimore, which port was entered May 19, 1907. Instead of returning home after discharging this cargo, the vessel was to proceed from Baltimore to New York to receive a cargo of general merchandise for Australia and New Zealand.

The other ship sailed from London May 19, 1906, with a general cargo for ten ports in Japan. Then a voyage in ballast was made to Java to receive a load of sugar for Philadelphia. Coal was taken from Philadelphia to Habana; thence the ship sailed in ballast to Galveston, reaching that port in January, 1907, in the height of the cotton-shipping season. At this port a cargo of cotton was loaded for Liverpool.

#### HIRING A SHIP.

A tramp ship is generally chartered or hired for one voyage at a time, although some charters cover a series of voyages, or even one year or more. The document containing the agreement between the shipowners and the charterer is called a charter party. The phraseology in some paragraphs of different charters is much the same and some expressions had their origin far back in the history of maritime traffic. As a rule the owner of a ship hires the officers and crew, paying their wages and providing for their subsistence, while other expenses of the ship are paid by the owner or by the charterers, according to the terms of the charter party.

#### MEASUREMENT OF A SHIP.

A vessel may be measured in at least four ways. There may be determined (1) the gross tonnage; (2) the net tonnage; (3) the dead weight capacity; and (4) the displacement tonnage.

The gross tonnage of a vessel is its entire cubic contents as measured in tons of 100 cubic feet.

The net tonnage is the gross tonnage, less all space used for purposes other than the accommodation of passengers and freight.

A third method of measuring a ship is the determination of its dead weight capacity—that is, the weight of a cargo which may be loaded without sinking the vessel too low in the water for safety.

One of the leading shipping agents of the United States in his testimony before the Industrial Commission in October, 1899,<sup>a</sup> stated that, as a rule in the trans-Atlantic trade, the gross tonnage of a vessel was 50 per cent more than the net tonnage, and that the dead weight capacity, including coal bunkers, was 50 per cent greater than

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<sup>a</sup> Report of Industrial Commission, vol. 4, p. 168.

the gross tonnage. According to this rule, a vessel of 3,200 tons (100 cubic feet each) net measurement, would contain 4,800 tons (100 cubic feet each) gross, and would be able to carry a weight of 7,200 tons (2,240 pounds each). As the measurement of a ship is so often given in current news items and trade reports only in net tons, or perhaps gross tons, this formula is useful in making a rough estimate of the weight of cargo that a given ship can carry. There is no rule for the accurate determination of one of these measurements from the data given for one or both the others, owing to differences in the construction of ships.

The dimensions and capacity of a given vessel may be learned from the official register made by the authorities of the country to which the vessel belongs and based upon actual measurements; or in case the tonnage as registered is called in question, it may be determined by another actual measurement.

The net tonnage of a vessel may be reduced to measured tons of cargo by multiplying the net tonnage by  $2\frac{1}{2}$ , the cargo being measured in tons of 40 cubic feet, and the ship itself, as has been said, in tons of 100 cubic feet.

A fourth way in which the size of a ship is expressed is in displacement tonnage—that is, the weight of a ship and its contents when immersed to some fixed depth. This is a common way of expressing the size of a war vessel.

#### DIFFERENT KINDS OF TONS.

The carrying capacity of a ship is limited by 2 elements—space and weight. The cubic contents of the space for cargo limit the bulk of the cargo, while the buoyancy of the ship limits the weight of the cargo. If the hold of a ship were filled with lead, the vessel would sink, while if the cargo were composed entirely of cotton there would not be sufficient weight without the use of ballast to bring the vessel down to a safe load line in the water. The load lines, as established by the British Board of Trade, include one set for fresh and one for salt water, and are marked on the outside of the hull about midway between the stem and the stern. For each kind of water there is a summer and a winter load line, the latter being lower down on the ship's side than the former. On United States merchant vessels the depth to which the ship is sunk in the water is indicated on the stem and also on the stern by a numbered scale, divided into feet, so that the number at the water line indicates the depth to which the vessel is sunk, and the load lines are specified in the ship's papers.

For cargo, the principal unit of measurement is a ton of 40 cubic feet, while the corresponding unit of weight is a ton of 2,240 pounds. The freight rate on some articles is determined by measurement; in



the case of others it depends upon the weight. In the absence of a special agreement, the ship's captain or agent usually decides whether measurement or weight shall be used as a basis for freight charges. In the case of wheat, a measured ton of the average quality produced in the United States equals from 82 to 85 per cent of a ton in weight, since 40 cubic feet contains on an average from 1,850 to 1,900 pounds of this article. In ocean freight the weight and measurement of corn and also of rye are usually expressed in the same units as wheat, the bushel when used being taken as 60 pounds.

#### CHARTER PARTIES.

##### TERMS OF A COTTON CHARTER PARTY.

One of the forms of charter parties most generally used on the Gulf coast of the United States is the Anglo-American cotton charter party, adopted by the Chamber of Shipping of the United Kingdom in July, 1895. Like most of the forms in use on the Atlantic and Gulf coasts of the United States, this charter party is intended for use in contracts covering a single voyage. The first words of the party after the title and date include the names of the charterers and the name, net tonnage, and class of the ship. The class depends upon the seaworthiness of vessels, and is a factor in determining the rate of marine insurance charged for the ship and its cargo.

There are sixteen numbered paragraphs in the Anglo-American cotton form. The first provides that the vessel shall have means of taking water ballast sufficient to allow a full cargo of cotton to be loaded. Cotton is so light that a full cargo of it will not weigh the ship down in the water far enough to insure stability, and ballast is used to add to the weight. By having water-ballast compartments which are filled and emptied by machinery a considerable saving of expense is effected. Paragraph 1 also contains the names of the ports of loading and of discharge and the price agreed upon for the charter.

Paragraph 2 provides that all space intended for cargo shall be at the disposal of the charterers, and also that certain movable bulkheads (partitions) and other obstructions must be taken down at the ship's expense if the charterers demand it. The third paragraph relates to the guarantee of the ship's carrying capacity and the means of deciding in case of dispute what that capacity is.

Paragraph 4 throws an interesting side light on the usual route followed by vessels sailing from the Gulf coast to Europe. They pass northward along the Atlantic coast of the United States so near the land that it is not far out of their way to run into Chesapeake Bay and load bunker coal—that is, coal for the use of the ship's engines—at Newport News or Lambert Point (near Norfolk). So, in

order to save space for cargo, charterers require a vessel to take from Galveston or New Orleans only enough coal to last until Norfolk or Newport News is reached, where a new supply is to be obtained, and it is provided also that the coal loaded here shall not exceed the amount necessary to reach the western coast of Europe. If the voyage is to continue to the Baltic Sea another supply must be obtained in the United Kingdom, or if the ship goes to Mediterranean ports bunker coal is to be secured at Gibraltar or Algiers.

Paragraph 5 relates to fixing the time to begin loading, and the next paragraph concerns lay days, demurrage, and dispatch money. Lay days are those which are allowed the charterers by the ship's owners for loading cargo. In case more time than the number of lay days is taken for loading, charterers are required to pay the ship's owners demurrage at the rate of 4 pence per net ton for each full day after the expiration of lay days. But if the charterers load the vessel in less time than is allowed them they are granted dispatch money for each day saved.

Port charges and other expenses are provided for in the seventh paragraph of this charter form. The charterers agree to bear the expense of compressing, loading, and marking the cotton, while the ship owners give the charterers 2 shillings 6 pence (61 cents) per net register ton, for which the latter are to defray certain port charges, including levee dues, wharfage, quarantine fees (but not fumigating), watching, tarpaulin hire or shed dues, and outward pilotage, also United States tonnage dues and inward pilotage for vessels arriving in ballast.

Paragraph 8 refers to the use of the ship's steam winches in loading the cargo and to the selection of the place of loading. The ninth paragraph provides that the captain of the ship shall sign bills of lading and also provides for the verification of bills of lading and the determination of and payment for dead freight. The ship is paid according to the terms of the Anglo-American form so much per net register<sup>a</sup> ton, regardless of the amount of cargo loaded. If the vessel is not loaded to its full capacity, it nevertheless receives full contract price, the charterers paying, in addition to the freight on the cargo actually taken, a sum to cover the loss to the vessel due to unused cargo space. This payment for unused carrying capacity is called dead freight.

The tenth paragraph provides for the advancement of money for the ship's current expenses, and fixes the rate of commission allowed the charterers for this service at 2½ per cent.

Paragraph 11 relates to the custody of the ship pending certain claims, and paragraph 12 specifies that the ship shall be consigned to

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<sup>a</sup> The word "register" in such expressions as "ton net register" refers to a measurement as officially recorded.

the charterers or their agents at the port of loading, and fixes the fees charged by them for transacting the ship's business.

Paragraph 13 stipulates that the vessel be consigned to the charterers or their agents at the port of discharge, and that they collect the freight from the consignee, paying over to the ship's owners the balance due them; provided, however, that the vessel may be consigned to other persons at the port of discharge upon payment to the charterers of £75 (\$360) and all debts due them by the ship.

Paragraph 14 relates to responsibility of each party to the contract in case of such misfortunes as fire, accidents, or strikes, and gives the ship permission to sail with or without pilots, and to deviate from its course to aid vessels in distress.

The arbitration of any dispute arising between the signers of the charter party is provided for in paragraph 15. The last paragraph limits the penalty for nonperformance of agreement to actual proven damages, not exceeding, however, the amount of freight due under the charter. Then follow the signatures of the parties to the contract and of the witnesses.

#### NET GRAIN FORM.

The most important form of charter party in use on the Gulf coast of the United States, with the possible exception of the form just described relating to the cotton trade and of the "Pixpinus" charter mentioned on page 28, is the net grain charter party. This form provides that the shipowner be paid an agreed sum per unit of weight of cargo, the charterer paying the ship's expenses at both loading and discharging ports. While in the cotton charter just referred to the freight is based upon the net tonnage of the vessel, the amount of cargo determines the freight paid under the net grain form.

The provisions of the net grain charter relating to payment of freight, advances of money to the ship's captain, lay days, demurrage, risks, consignment of ship, signing bills of lading, and some other matters are similar to the provisions of the Anglo-American cotton charter and of numerous other forms in common use. The net grain charter is sometimes used for other articles than grain, the rate of freight being computed upon the same basis as for grain—that is, the rate agreed upon between the charterers and the owners of the ship. The shippers, however, may pay the charterers different rates, according to the character of the articles loaded, these rates being so adjusted as to afford the charterers a compensation sufficient at least to meet the charge due by them to the shipowner.

Grain, which in maritime trade means such grain as wheat, rye, and corn, is one of the most important of all articles carried on the ocean. It is to be had in large quantities in different parts of the world, and there is practically no time of the year when on one or more coasts there are no surplus grain crops awaiting shipment. By

January and February the wheat exports from the Pacific coast of the United States have begun to arrive in Europe in considerable quantities; in March the wheat ships from Argentina and Uruguay are arriving in Europe with their first cargoes of any importance; and one month later Australian shipments begin to reach their destination. Wheat from India and northern Africa begins to arrive in considerable quantities in June and July; the Winter wheat of Russia and America first reaches the ports of western Europe in August, just one month before the arrival of the Spring wheat of Russia and of other Black Sea countries. United States Spring wheat begins to cross the Atlantic in considerable quantities in October, and Canadian Spring wheat in November.

The ocean movement of corn from ports in the Northern Hemisphere takes place during the late fall, winter, and early spring; the surplus from the River Plata begins to reach western Europe in July. So the traffic in corn is also well distributed throughout the year.

#### OTHER FORMS OF CHARTER PARTIES.

While there is a general uniformity in all forms of contracts for hiring ships, especially for the same kind of traffic, there are enough differences in the terms of agreements in various lines of trade and among different ship brokers and owners to result in a large number of different forms of charter parties and in various modifications of the same general form. Some of these forms, together with one or more provisions from each, are given as further illustrations of the business methods involved in hiring a ship.

**BALTIMORE BERTH GRAIN CHARTER PARTY.**—An important provision of the Baltimore berth grain charter party is that the days allowed for loading a vessel are limited to five, demurrage being charged if more time is taken, provided that the delay is due to a fault of the charterers. Another distinctive feature of this form is that the charter party is exchanged for regular bills of lading and is superseded by them when the cargo is loaded and the ship ready to sail.

**"CORK FOR ORDERS" CHARTER PARTY.**—Another form used at Baltimore is the "Cork for orders" charter party. This title does not appear on the printed form, but instead the heading reads "Approved Baltimore Grain Charter Party—Steamer—Range." The word "range" refers to the provision in the charter by which the loading port is not specified at the time the charter is made. This provision requires the vessel to report at some specified place, for instance Delaware Breakwater, there to receive orders as to the loading port. In case the ship has a cargo to discharge in the United States before entering upon the service required by the charter, orders naming the loading port may be sent to the vessel at the last port of discharge.



In this charter the loading ports are limited to the Atlantic coast within a certain range, and for this reason the word "range" appears as part of the printed title. This form provides also that the ship proceed from the loading port to Queenstown, Falmouth, or Plymouth, there to receive orders as to final destination. Formerly the agreement named Cork as the port at which to receive orders and the expression "Cork for orders" continues to be used. In actual practice at the present time, as was mentioned on page 10, the final destination of the vessel is usually determined before the cargo is loaded, so that the ship is ordered from the loading port direct to the port or ports of discharge.

One important difference between the "Cork for orders" form and the net grain form is that under the former contract the shipowner pays the port charges, while the net grain form requires these charges to be paid by the charterers.

**BERTH TERMS GRAIN CHARTER PARTY.**—New Orleans has a berth terms grain charter party which is similar to the berth terms charter used at Baltimore. In the New Orleans form, however, the number of lay days is not specified, but is left open to agreement. The charterers pay elevating charges for grain, but the vessel meets other expenses connected with the cargo.

**GALVESTON GRAIN CHARTER PARTY.**—A grain charter party used at Galveston is similar to the "Cork for orders" form used at Baltimore. Provision is made for calling at some intermediate port for orders as to final destination. All port charges are paid by the shipowners. One clause is the same as the provision in the Anglo-American cotton charter—that is, the vessel is required to leave Galveston with only sufficient coal to reach Norfolk or Newport News and there to take just about enough to run the ship to the western coast of Europe. If the vessel is to continue to the Baltic Sea, another supply of coal must be obtained in the United Kingdom.

**SAVANNAH COTTON CHARTER PARTY—LUMP SUM.**—Like a number of other forms, this Savannah lump sum cotton charter party does not definitely name the loading port. The chartered vessel is to call at Tybee Roads, at the mouth of the Savannah River, to receive orders to proceed for cargo to Fernandina, Brunswick, Savannah, Charleston, Wilmington, Norfolk, or Newport News. If the vessel loads at Wilmington, N. C., only, or at Wilmington and Norfolk or Newport News, the rate is 3 pence per ton less than that named in the charter, and if Norfolk, Newport News, or both are selected as the only loading ports, the freight rate named in the agreement is reduced at the rate of 6 pence per ton. The shipowner gives the charterers 2 shillings 6 pence (61 cents) per net register ton, for which they are to pay charges at the loading port. With the exception of some minor provisions, this form is similar to the Anglo-American cotton charter described on pages 23 to 25, inclusive.

**CHAMBER OF SHIPPING PITCH PINE CHARTER.**—A form of agreement for carrying timber and lumber was adopted by the Chamber of Shipping of the United Kingdom in 1898 for use in the United Kingdom, on the European Continent, and on the Mediterranean Sea. The form is also in extensive use on the Gulf coast of the United States and is known among ship brokers by its telegraphic code name "Pixinus." The name printed on the charter form is "Chamber of Shipping Pitch Pine Charter." The rate of freight is noted in shillings and pence per "St. Petersburg standard hundred of 165 cubic feet." The shipowner pays all port charges and pilotage fees, except that in case the cargo is discharged at one of the docks on the river Thames the consignees are to pay two-thirds of the dock dues at that place. The number of lay days is determined as in a number of other charters by allowing 1.25 days for each 100 net register tons of the vessel.

**EUROPEAN CHARTER PARTY (SAIL, \$2).**—The form entitled "European charter party (sail, \$2)" also is used for timber and lumber shipments, and, as the title indicates, is intended for contracts made with sailing vessels. A similar form for steamships bears the title "Timber—Steam—\$2 form—1897." Each of these charters is known as the "Two-dollar form" on account of the provision in it which requires the shipowner to pay the charterer \$2 for each 50 cubic feet of cargo, in consideration that the shipper pay the expenses of stowing and port charges.

A simple form prepared for use in the schooner trade of the Gulf coast provides for the expression of the rate in dollars and cents per thousand feet. It also specifies that the lumber or timber shall be loaded from a wharf or lighters, thus preventing wet timber from rafts from being made part of the cargo.

**NAVAL STORES CHARTER PARTY.**—The rate of freight named in a naval stores charter form is so many shillings and pence per 310 pounds of rosin, or 40 gallons of spirits of turpentine, or rosin oil. The freight as computed in this way is increased by 5 per cent, this additional charge being called *primage*. *Primage* is nearly obsolete in some parts of the shipping trade, but is in general use in trans-Atlantic line traffic, especially with the United Kingdom.

**TIME CHARTER PARTY—WEST INDIA FRUIT TRADE.**—According to the terms of a time charter for the West India fruit trade, the shipowner is to engage the officers and crew of the vessel, pay them, and furnish their subsistence, while the charterers furnish coal for the engines and pay port charges and similar expenses of the vessel. One feature of the fruit charter as distinct from other time charters is the restriction "that, on account of the perishable nature of the cargoes that this steamer is intended to carry she is not allowed to stop to pick up any wreck or in any way assist or tow any vessel, especially when by doing so she is liable to be detained, only in order to save human life."

The freight charge under this form of contract is paid in advance every half month; and in reducing English money to United States money, the pound sterling is rated at \$4.85. The equivalent of the pound sterling in some other charters is \$4.8665, while in a large proportion of the trans-Atlantic traffic the equivalent is regularly \$4.80, unless the freight charge from the United States is prepaid. Some charters specify that when it is necessary to reduce pounds to dollars, the equivalent used shall be the current rate of exchange.

#### SHIPPING AGENTS AND BROKERS.

There are five persons or classes of persons interested in a charter. First, the shipper; second, his forwarding agent; third, the agent of the ship in the port of loading; fourth, the ship's agent in its home port,<sup>a</sup> and fifth the owner or owners of the vessel. The forwarding agents are sometimes also agents for the ship in the port of loading. The business of the forwarding agent consists in making terms with the agents of the vessel and in securing traffic from the shippers. It is from the forwarding agents and the agents of steamship lines that quotations of ocean rates are obtained. The office of forwarding agent is performed in a number of ports of the United States by foreign freight agents of railroads. Often in a large port a ship broker or shipping agent deals only with the forwarding agent on the one hand, and with the ship's agent in the home port on the other. It is necessary for the ship broker to keep track of freight vessels, to know their capacity for carrying different kinds of cargo, and to be able to make a contract on such terms as will justify him in quoting to forwarding agents or to shippers freight rates low enough to obtain a cargo. One phase of the business of the ship's agent at the home port is roughly outlined on page 18 under the title "Service of the submarine telegraph."

In the case of shipments made in liners, the shipper may be represented by a forwarding agent, who makes terms with the steamship company and attends to the transfer of the consignment to the vessel, or the shipper may deal directly with the agent of the steamship line.

#### CONSTRUCTION AND OPERATION OF VESSELS.

##### GREATER CARRYING CAPACITY.

One of the most effective forces in reducing the cost of carrying on the ocean has been the improvement in the construction of vessels. Both liners and tramps are now built much larger than in the past. The cargo of a tramp ship not infrequently includes the product of 15,000 acres of average wheat land or the cotton yielded by twice that area, and it would take two such cargoes to fill the hold of one of the

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<sup>a</sup> The port at which the ship is officially registered.

larger freight liners. The carrying capacity of a number of the passenger vessels in the trans-Atlantic trade is still greater, some of them having a dead-weight capacity of 12,000 to 15,000 tons of cargo.

A larger cargo means a greater amount of freight earned or an increased opportunity to lower rates in bidding for business, or it may be both these advantages. A vessel carrying 250,000 bushels of grain earns on one cargo \$3,000 more than the vessel whose capacity is limited to 200,000 bushels, assuming the rate charged by each to be 6 cents per bushel, or on a cargo of 20,000 bales of cotton a ship receives \$10,000 freight in excess of another ship which carries only 15,000 bales, assuming the rate to be \$2 per bale.

The influence of a number of large vessels is keenly felt by the smaller ones engaged in the same traffic, especially when cargoes are not plentiful and competition among vessels forces rates down. While the size of many ocean liners and their earnings from carrying passengers and mails make it possible for them to offer low rates, much lower than can be profitably accepted by tramps, the high speed of some of these liners involves an expense for coal and for wages that partly offsets the advantage gained by increased cargo space.

Ships are built at present not only larger than in the past, but according to improved models. A freight ship is made with a view to combining great carrying capacity with low cost of operation. The hull of a modern vessel built for the charter traffic approaches the shape of a huge rectangular box with the lower edges rounded. The engines are often of moderate power, just about sufficient to propel the ship across the Atlantic in perhaps twice the time taken by the passenger steamer and with a very much smaller expenditure of coal.

#### SOME MINOR IMPROVEMENTS.

The holds of some of the freight vessels are made as free from obstructions as practicable, so that the carrying capacity may be as large as possible and that cargo may be more easily stowed. Some vessels engaged regularly in the Black Sea grain trade have permanent bulkheads (or partitions) running through the center of the hull from one end to the other in order to keep the grain from shifting from one side to another, and thus unbalancing the vessel. A permanent longitudinal bulkhead saves the expense of putting in a temporary partition every time a full cargo of grain is loaded, as some vessels have to do. Another device for keeping a cargo of bulk grain from shifting is to have the hatch combings built several feet high and filled to the top with grain. The hatch combings are box-like structures around the openings in the deck. When these inclosures are filled with grain a supply is afforded to feed down into



the hold as room is made from time to time by some of the cargo moving about. By this means every crevice in the hold is soon filled, so that finally there can be no shifting of the mass of grain.

There is an improvement in the construction of some freight steamers which from an artistic point of view, might call forth adverse criticism. The masts, which have always been along the center of the deck, have been shortened and placed in rows, one along each side of the deck. The masts are no longer used for sails, but as standards for the blocks and tackle used in loading and unloading cargo, and their location at the sides of the vessel makes it more convenient to lift the cargo and to lower it into the hold of the vessel or to a wharf or lighter.

The few changes mentioned above serve to illustrate the tendency to increase the efficiency of ocean steamships, and thus indirectly to lower freight charges. It will be noticed that more improvements in cargo ships than in passenger liners have been mentioned, for, while the construction of the latter has made remarkable progress, the nature of their improvements is more complex and has to do with both passenger and freight traffic. For the purpose of this bulletin, which deals with freight traffic only, the building of cargo ships offers the simplest and best illustrations.

#### SAILING VESSELS.

Sailing vessels are still active in spite of the extensive traffic of the steamships. Even now the carrying of grain from the Pacific coast to Europe is done almost wholly by sailing vessels, which also carry a large percentage of the lumber exported from the southern ports of the United States. The word "ship" is applied practically to all ocean steamers, but when referring to sailing vessels a "ship" is a particular kind of craft, one by no means as common as it was about 1870 or 1880. Changes are taking place in the construction of sailing vessels as well as steamers, and the full-rigged ship is being replaced by barks, barkentines, and other vessels having fewer sails and less rigging than ships, and therefore requiring fewer sailors. With the passing of the more complex rigging has come an increase in the size of hulls, and hence the decrease in the number of sailors has been accompanied by an increase in the carrying capacity of sailing vessels. Labor is saved in the operation of sailing vessels, not only by economizing in the construction of the hull and in the character of the rigging, but sometimes in the use of steam winches for hoisting and lowering sails and in the application of other mechanical devices to other operations formerly done by hand.

In spite of the progress in construction and operation of sailing vessels, they are being supplanted more and more by steamships.

Even in the grain trade of the Pacific coast a few cargoes in the season of 1906-7 were taken to Europe by steamers. The steamships made the trip in about eleven weeks, while the sailing vessels required from seventeen to nineteen weeks. The changes in the relative importance of sailing vessels and steamships in the foreign trade of the United States during the thirty years ending June 30, 1906, are illustrated by the figures in Table 7, which was compiled from reports of the Department of Commerce and Labor. The carrying capacity of sailing vessels in the foreign trade of the United States has declined both absolutely and in relation to the tonnage of steamships in that traffic. Prior to the fiscal year 1881 the capacity of sailing vessels in this trade exceeded that of steamers; but, beginning with 1881, steam tonnage has been the greater and has continued to increase until in 1906 it was nearly 11 times the corresponding tonnage of sailing vessels.

TABLE 7.—*Tonnage of sailing and steam vessels cleared from the United States in foreign trade, 1876-1906.*

Year ending June 30—	Total net tons.	Sailing vessels.		Steam vessels.	
		Net tons.	Per cent of total.	Net tons.	Per cent of total.
1876.....	9,839,458	5,421,277	55.1	4,418,181	44.9
1877.....	10,388,594	5,819,737	56.0	4,568,857	44.0
1878.....	11,843,571	6,529,206	55.1	5,314,365	44.9
1879.....	13,616,690	7,203,834	52.9	6,412,856	47.1
1880.....	15,295,697	7,732,251	50.6	7,563,446	49.4
1881.....	15,793,997	7,077,159	44.8	8,716,838	55.2
1882.....	14,846,468	6,198,031	41.7	8,648,437	58.3
1883.....	13,565,022	5,593,384	41.2	7,971,638	58.8
1884.....	12,205,719	5,188,559	42.5	7,017,160	57.5
1885.....	12,496,275	5,174,214	41.4	7,322,061	58.6
1886.....	12,413,235	5,066,677	41.1	7,346,558	58.9
1887.....	13,510,535	5,123,719	37.9	8,386,816	62.1
1888.....	13,252,197	4,946,260	37.3	8,305,937	62.7
1889.....	13,671,661	4,700,571	34.4	8,971,090	65.6
1890.....	15,429,049	4,526,588	29.3	10,902,461	70.7
1891.....	15,410,710	4,258,842	27.6	11,151,868	72.4
1892.....	18,258,165	4,408,410	24.1	13,849,755	75.9
1893.....	16,825,481	4,179,771	24.8	12,645,710	75.2
1894.....	17,306,333	3,881,167	22.4	13,425,166	77.6
1895.....	17,023,645	3,685,223	21.6	13,338,422	78.4
1896.....	17,818,790	3,633,996	20.4	14,184,794	79.6
1897.....	19,878,405	3,697,270	18.6	16,181,135	81.4
1898.....	21,891,738	3,785,406	17.3	18,106,332	82.7
1899.....	22,177,483	3,350,161	15.1	18,827,222	84.9
1900.....	23,617,658	3,298,691	14.0	20,318,967	86.0
1901.....	24,889,368	3,037,060	12.2	21,852,308	87.8
1902.....	24,242,104	2,924,162	12.1	21,318,042	87.9
1903.....	24,823,164	2,660,663	10.7	22,162,501	89.3
1904.....	24,191,983	2,311,033	9.6	21,879,950	90.4
1905.....	25,019,820	2,159,581	8.6	22,860,239	91.4
1906.....	26,167,850	2,269,530	8.4	24,000,320	91.6
Mean for 5 years:					
1876-1880.....	12,196,802	6,541,261	53.6	5,655,541	46.4
1881-1885.....	13,781,466	5,846,569	42.4	7,935,227	57.6
1886-1890.....	13,655,335	4,878,763	35.7	8,776,572	64.3
1891-1895.....	16,964,667	4,082,683	24.1	12,882,184	75.9
1896-1900.....	21,076,815	3,553,125	16.9	17,523,690	83.1
1901-1905.....	24,633,288	2,620,480	10.6	22,012,808	89.4

## WAGES.

One important cause of differences in the cost of operation of different vessels is the variation in the wages and also in the efficiency of seamen. The wages paid on board an ocean-going vessel depend upon conditions in the port at which the seamen are shipped. At a given time in a certain port vessels of all nationalities are apt to pay about the same wages. Differences in the scale of wages between merchant ships of different countries may be due largely to the fact that a crew is usually engaged for a round trip, so that if the first crew is shipped in a home port and also discharged at home, each successive crew would be apt to be obtained at home also. So there is a tendency for the wages paid in the merchant marine of a given country to be influenced largely by conditions in the ports of that country.

It is required by the laws of some countries that the crews of their merchant vessels in deep-sea trade be shipped and discharged in the presence of public officials. By this means the government maintains an oversight over the contracts and is thus able better to protect the seamen from ill usage and to protect the ship's captain and owners by making an official record of the shipping contract. From records of these contracts, tables of marine wages have been compiled by the United States and the United Kingdom.

According to the report of the United States Commissioner of Navigation, the usual wages of able seamen on steam merchant vessels carrying the United States flag ranged, during the year ending June 30, 1906, from \$25 to \$45 per month, while on steam vessels belonging to the United Kingdom the corresponding wages in the calendar year 1905 were from \$18 to \$22 per month. On United States sailing vessels during the fiscal year 1906 able seamen received from \$18 to \$40 per month, while on British sailing vessels the prevailing wages in 1905 were about \$15 per month. The prevailing wages of first mates on American steam vessels ranged from \$50 to \$125, while British first mates were paid from \$40 to \$57. Usually on United States sailing vessels first mates received from \$35 to \$60, while on British sailing vessels these officers were paid from \$27 to \$39 per month. Sleeping accommodations and food for officers and crew are regularly provided at the expense of the shipowner.

There are numerous instances of merchant vessels shipping crews in foreign ports, so it must not be supposed that the custom of obtaining seamen at home is observed by all ships.

In the trade with the Orient, Lascars and other Asiatics are often employed as firemen. They are believed to be better able to endure the heat in the engine room while the ship is in the Tropics than are

Americans or Europeans. The wages of Lascar firemen are generally much lower than those of Americans or Europeans.

A reasonable basis of comparing the maritime wages of two countries is the total amount of wages paid by one ship of each country. In making such a comparison, care must be taken to select two vessels of about the same size, form of construction, and speed, and which are engaged in similar traffic. A fast vessel requires more firemen than does a slow one, and a passenger steamer employs persons for services which are not required for freight traffic.

The wages paid in 1900 on three tramp ships are given in the report of the United States Commissioner of Navigation for 1901 as follows: One United States vessel, \$1,215 per month; one British vessel, \$961.03; another British vessel, \$979.28. Again, a comparison of wages on three trans-Atlantic liners is made in the same report. The United States liner paid 380 officers and crew \$11,306.09 per month; the British ship employed 427 persons at a cost of \$9,891.32, and the German vessel paid \$7,715.55 per month to 500 employees.

#### CONSUMPTION OF COAL.

There are at least three elements of cost in the consumption of coal by a steamship: (1) The actual money required for purchasing the coal, (2) the wages of the coal passers and firemen, and (3) the space required in the vessel for storing the coal.

A fast vessel consumes much more coal proportionally than a slower one. According to Table 8, compiled by the United States Commissioner of Navigation, a ship of 10,000 gross tons would consume 44 tons of coal per day when going 10 knots per hour and 305 tons per day when going 20 knots per hour, while 15 firemen would be required to maintain the slower and 102 firemen the quicker rate of speed.

TABLE 8.—*Coal consumed and number of firemen required by a typical steamship of 10,000 gross tons for different rates of speed.<sup>a</sup>*

Knots per hour.	Tons per day.	Number of firemen.	Mileage per year.	Cost of coal and handling per year.
10	44	15	42,000	\$33,180
11	53	18	46,200	40,194
12	65	22	50,400	49,392
13	79	26	54,600	60,060
14	96	32	58,800	72,912
15	117	39	63,000	88,830
16	144	48	67,200	108,864
17	173	58	71,400	131,376
18	209	70	75,600	158,004
19	254	85	79,800	192,318
20	305	102	84,000	231,000
21	371	127	88,200	281,358

<sup>a</sup> Report of U. S. Commissioner of Navigation, 1901, p. 25.



The figures in Table 8 are intended to apply to a typical vessel. The actual consumption of coal on a certain trans-Atlantic liner of 9,984 gross tons in 1900 was 290 tons per day. The ship employed 139 firemen and coal trimmers and 19 engineers, and had a speed of 20 knots per hour. One of the smaller tramp ships which carried cotton from Galveston in January, 1907, measured about 4,500 gross tons and had a speed of 8 or 10 knots per hour. This vessel used 25 tons per day of average quality of soft coal.

The coal consumption of a vessel is increased when the hull becomes encrusted with a marine growth and does not run smoothly through the water. The low rates of speed caused by this growth and the cost of cleaning it off occasionally add something to the cost of ocean transportation. Experiments have been made to devise means of preventing these marine animals from becoming attached to hulls, and perhaps in the future vessels will not be troubled in this way.

In regard to the space occupied by coal on board ship, it will be noted that economy is demanded in the terms of some of the charters mentioned on pages 23 and 27, especially those which provide for contracts from Galveston or New Orleans. The bunker coal carried by cargo ships from these ports is sometimes limited by contract to a supply sufficient only to carry the vessel to Hampton Roads, and the supply taken on at Hampton Roads is to be just about enough to reach the first coaling stations on the western coast of Europe.

Coaling stations in various parts of the world are supplied partly by means of tramp ships that secure Welsh, American, or other coal as cargoes at very low rates, and carry it to those stations on the way to ports where more profitable cargoes are to be loaded. It is by no means an uncommon thing for a new freight ship built in England to take out as its first cargo Welsh coal to one of these stations.

#### **A SHIP'S EXPENSES IN PORT.**

On the high seas the expense of a ship is limited to the actual cost of making it go; there are no tolls to pay, no fees required for various kinds of inspection, and, unless the vessel is wrecked, there is no expense incurred for extra pilotage, towage, or other outside help in operating the vessel. This absence of extra charges during such a large part of a voyage has much to do with the low cost to a ship-owner of carrying goods and with the low freight rates charged on the ocean.

But when a ship enters a port there are a number of additional items of expense to be met. The list of items and amounts to be paid vary in different ports, so that the charges mentioned in the paragraphs below must not be understood to include all charges or to



apply to all ports. Some of the more common items in United States ports are pilotage, towage, tonnage tax, quarantine fees, fees for use of docks, wharfage on cargo, and stevedore charges.

#### PILOTAGE AND TOWAGE.

A ship's captain can navigate the ocean with the aid of charts and with instruments that determine direction, latitude, and longitude, but upon entering a harbor it is necessary to have a knowledge, in detail, of the actual location of the channel and of the characteristics of the tide in order to steer the vessel safely. Hence the services of a local pilot are often necessary, especially in a port which the vessel does not visit often.

The rates of pilotage at New York depend upon the draft of the vessel, the direction in which it is going, and the season of the year. The fee is less for taking a ship out of the harbor than for conducting it in, and the charge from November 1 to April 1 is higher than during the other half of the year.

On entering the port of New Orleans from the Gulf of Mexico two pilotage fees are paid, one for taking the ship across the bar at the mouth of the Mississippi River and the other for conducting the vessel up or down the river. The rates of pilotage at different ports are influenced by the distance between the harbor and open water and by other conditions. For a vessel drawing 25 feet of water an approximate charge for pilotage into the harbor at Boston or New York is about \$125 and an average fee at New Orleans about \$150.

Occasionally an ocean vessel requires the services of a towboat or tug when entering a harbor or when moving from one part of a harbor to another. When a vessel is chartered to load at a certain port and it becomes necessary to receive part of the cargo at two or more different places in the harbor, towboats are usually employed and the charge for towage is often shared by the charterers, especially if the vessel is moved more than once after entering the harbor.

Movements of this kind in port are reduced in number by the use of lighters and floating elevators.

#### TONNAGE TAX AND HARBOR DUES.

A tonnage tax is levied by the United States upon all vessels, both foreign and domestic, coming from foreign ports and engaged in trade. The amount of tax upon each vessel is based upon its net tonnage and also upon the location of the foreign ports from which the vessel clears.

Ships coming from foreign ports in North America, Central America, the West Indies, the Bahamas, the Bermudas, the coast of South America bordering on the Caribbean Sea, or the island of Newfoundland are charged 3 cents per net ton. This tax is collected for five

successive trips during one year, but for no more during that year, making a total maximum tax in one year of 15 cents per ton.

On vessels coming from countries other than those mentioned, the duty amounts to 6 cents per ton and is collected for only five trips in any one year. There is a provision in the law establishing the tonnage tax which enables the President of the United States to abolish the collection of duty on vessels from countries which grant similar favors to United States shipping. Under this provision the following ports have been so favored, and ships coming from them are not charged tonnage tax: Island of Montserrat in the West Indies; Ontario, Canada; Greytown, Nicaragua; Bocas del Toro; all ports in the Netherlands; all free ports in the Dutch East Indies; Guadeloupe; Grenada; Copenhagen; and all ports in the Republic of Panama. The total tonnage tax collected during the year ending June 30, 1906, amounted to over \$967,000.

The quarantine fee which is collected on account of the services of the medical inspector who boards the vessel upon its arrival in port is another expense to be met by the owners or charterers of the vessel and is covered in the long run by the freight paid by the shippers or the consignees of the cargo.

Harbor dues are collected by the local government having control of a port. The dues at two ports will serve as illustrations. The harbor dues at New Orleans on each vessel arriving at that port in ballast or with a cargo of green fruit (usually bananas) are fixed at \$10, and a further charge of \$5 is made for each vessel arriving with a general cargo. However, for vessels under 100 tons the charge is only \$2.50, and for vessels of 100 tons and under 500 the charge is \$5. The regular rates apply to vessels of 500 tons and over.

At Savannah the harbor dues for transient vessels are as follows: For a steamship, \$15; a sailing ship or bark, \$6; for a brig or schooner, \$4. Each coastwise steamer running regularly to Savannah is charged a harbor fee of \$6 per month, and each brig or schooner in the coasting trade is charged \$4 per trip, payable not more than twice in twelve months.

#### WHARFAGE CHARGES.

For the use of a wharf or pier a vessel may pay a fixed rental of so much per month or year, or the payment may be so much per net register ton for each voyage. The former method is adopted generally by the steamship lines which use the city wharves in the port of New York. In New Orleans, however, even the liners pay for the use of wharves at so much per net register ton for each trip. Each steamship line at this city is assigned by the superintendent of the port to a certain wharf, which is used regularly by that line. However, when a liner's place at a wharf is vacant, it may be used by any

other vessel at the discretion of the superintendent of the port. In New York, as well as in New Orleans and some other ports, transient vessels pay for the use of wharves so much per ton for each trip. In some instances where wharves are under private management, no charge is made for the vessels lying alongside, the income from the wharf being obtained by charges levied on the merchandise passing over it.

At most or all of the wharves in Galveston the charges are levied only upon merchandise, no fees being collected from vessels for use of the docks, while at New Orleans conditions are practically reversed, no charges being made upon any exported goods using the city's wharves.

#### MINOR CHARGES.

The fees for loading and unloading cargoes are sometimes called stevedore charges, the man who superintends this work being called a stevedore. These charges are often computed at so much per ton of cargo, and do not apply to goods requiring special methods of handling, such as grain or coal. Some of the services for which these stevedore charges are made are mentioned on pages 39 to 42, under the heading "Methods of transferring cargoes."

Closely connected with stevedore charges is the expense for light-erage. Open and covered flat boats and other small craft are often used to carry goods from different parts of a harbor or for longer distances to a ship's side for loading. These vessels are called lighters, and their compensation is sometimes called lighterage. The uses and methods of operating these lighters are described more fully further on.

In addition to the expenses mentioned in the paragraphs immediately preceding, it must be borne in mind that in various ports a vessel may expect to incur some or all of a list of other similar charges of greater or less importance. Fees for the survey of a ship or cargo by port wardens, hire of tarpaulin for covering a partly loaded cargo, hire of sheds for protecting goods on the wharves, charges for fumigation, and a number of others are also among the possible expenses of a vessel in port.

#### METHODS OF TRANSFERRING CARGOES.

The charges for loading and unloading a cargo are sometimes paid by the shipper or the consignee as separate items, and sometimes are included in the amount paid as ocean freight. In any case the expense of handling goods at the loading and discharging ports is paid in the long run by the consumers, and is also of no little interest to producers. A brief description of the more common methods and appliances used in transferring a cargo to and from a ship, especially those in use at various ports of the United States, will serve to show



the character of the services for which stevedore charges are made. The handling of cotton furnishes a good example of loading methods, for many other articles are handled in similar ways.

#### LOADING COTTON.

When placed on shipboard, cotton is regularly in the form of compressed bales. These are delivered to the wharf or ship by railroads, boats, wagons, drays, or carts. The bales are moved from one place to another on the wharf by means of hand trucks, the same kind as is used generally in railroad stations, warehouses, mills, and other similar places for moving heavy articles.

Sometimes when drays are delivering cotton to a wharf at the same time that a ship is receiving a cargo, the drays are driven directly to the ship's side and the bales are rolled off within easy reach of the ship's loading tackle. In placing the cotton in the hold of the ship, two or three bales are encircled by a loop of strong rope which is attached to the tackle of a steam winch. Then by the power of a small stationary engine on the ship the load is pulled up a steep gang plank to the deck, across another plank or series of planks to the hatchway, and then is lowered into the hold. Work is carried on at two or more hatchways at the same time. The bales are placed in position in the hold by men skilled in the art of stowing, for it requires no little experience to stow cotton bales or other packages so that not only will a vessel carry as much as possible, but also that the cargo will not shift as the ship rolls and pitches on its ocean voyage.

#### SCREWING COTTON.

A method of stowing cotton, at one time more generally in use than at present, is to screw the bales into the hold of a ship. The screwing is done in this way: The bales are stood on end close together in a semicircle, the concave side of which faces an inside wall of the hold. Pressure is then brought to bear upon the convex side of the semicircle until it is forced flat up against the wall. Then a second semicircle is formed of other bales placed close together and these in turn are brought up against the flat surface made by the preceding row of bales; then a third row is put into place, and so on until one layer of cotton is formed in the hold. The next layer may be composed of bales placed on their sides and not packed so tightly as the first one. A third layer is made of upright bales screwed into position in the manner described, and the operation is continued until the cargo is complete. By this means cotton is packed into a space much smaller than would be required for the same number of bales set closely, but without the use of such pressure. The screwing is done by means of power screws operated by hand. The

men who do this work and also their overseers require special training. An inexperienced laborer would suffer greatly from exhaustion if he tried to stand with two or three experienced screwmen turning the levers of a cotton screw. This service is expensive and is resorted to only when it is especially desirable to economize cargo space, but it is still common enough to keep the screws from rusting at the Southern ports. At some ports, as Mobile, the practice is still general, but at Savannah as a rule the screws are called into use only when some odd corner of a cargo needs filling out.

One of the chief causes for the decline in this method of stowing cotton is the increase in the size of freight vessels. A large ship will call for a load of cotton, take 20,000 or more bales, which are stowed closely, but without the use of screws, and the vessel puts to sea again in a short time. A smaller ship may spend a week or so having 15,000 bales screwed into its hold, in order to gain the extra freight paid on the additional bales which this method of packing makes possible to carry.

Another advantage of screwing cotton bales into position is a reduction in the danger from fire that might be caused by the iron ties around the bales chafing against steel or iron parts of the hold. This advantage may be offset in some degree by the possible injury to the hull of the vessel due to the outward pressure of the closely packed bales. Another disadvantage in screwing cotton is the difficulty of unloading. Sometimes the spars to which the unloading tackle is attached are broken before a bale can be pulled from one of the closely packed layers, and sometimes it is necessary to tear one bale to pieces before others in a layer can be moved.

#### DELIVERING GOODS AT THE SHIP'S SIDE.

The delivery of cotton to the ship from the water side is an interesting example of economical handling. A number of ports make more or less use of this method. About 10 per cent of the cotton received at Galveston in 1905-6 was brought down from the compresses at Houston on barges, each barge carrying from 1,200 to 1,500 bales and sometimes as many as five barges at one time were towed by a single tug. A cotton barge with a load intended for export is towed alongside a ship and the bales transferred to the hold in the same manner as from a wharf, but without requiring much if any handling by truckmen.

Lighters, or transfer boats, are especially useful in harbors having piers on opposite shores so that communication from one pier to another by land is not easy. Such is the case at New York, Baltimore, Norfolk, and Savannah, while at such ports as Mobile and Galveston, where the wharves are largely along one shore, lighters are not needed to such an extent.



Occasionally a large vessel in search of cargo enters a harbor the entrance to which is obstructed by a bar impossible to cross with a full cargo aboard. In such a case only as much of the cargo as will allow the vessel to clear the bar is loaded at the wharf; the remainder is carried by lighters and loaded onto the ship in deep water. Such a practice is not necessary in most harbors of the United States, but occasionally a small seaport builds up a maritime trade faster than money can be secured for improving the harbor and its approaches, and as a temporary expedient lighters are used to help parts of cargoes over a shallow stretch of water.

Railroad cars as well as lighters are sometimes brought to the ship's side and the contents transferred directly to the vessel's hold. At a number of ports railroad tracks are laid on the edge of the piers, and in some places, notably at Pensacola, the piers are two stories high, with a track on each story. A saving is thereby effected in that the use of hand trucks is superseded by direct transfer to or from a vessel.

#### HANDLING A GENERAL CARGO.

A general cargo is one consisting of a miscellaneous lot of articles, and contains such packages as boxes, crates, barrels, and bales. These are transferred from wharf or lighter to the hold, usually by means of pulleys operated by steam winches. One method of transferring goods to a ship from the second floor of a pier is by simply sliding boxes and other packages down a plank to the hatchway and having them lowered from the hatchway to the hold. One of the modern appliances is a moving belt for carrying packages to or from the deck of a vessel. The stowing of a general cargo requires skill, especially since packages are of various sizes and shapes and of various degrees of strength. Too much stress can hardly be laid upon the necessity of packing strongly all breakable goods intended for export in ocean vessels. More or less movement is apt to take place throughout the cargo, and unless articles are well packed they may be injured in the hold of a vessel during a voyage or when they are loaded or unloaded.

#### PROMPT TRANSFER IN COASTWISE TRAFFIC.

In loading steamships engaged in coastwise line traffic quicker methods are sometimes used than for loading regular ocean-going vessels. Coastwise steamers, unlike the ocean-going carriers, usually have large doorways in their sides on a level with each of two or three decks; so that each deck may be loaded and unloaded separately. To reach the lower doors of one of these steamers and also to reach the decks of smaller vessels sloping ways are sometimes built in the wharves, and packages of different kinds are carried

down these inclines on hand trucks into the hold. Goods are conveyed to other decks of coastwise steamships by the use of hand trucks or steam winches. These steamers are often unloaded rapidly, the goods coming from all decks at the same time. From the upper deck smaller packages are slid down planks to the wharf. The second deck being near the level of the wharf is unloaded by means of hand trucks. Sometimes from the lower deck, when it is reached by an inclined way in the wharf, the hand trucks are carried to the main wharf floor by means of an endless belt conveyor. The saving of time effected by these quick methods helps to shorten the time required for the shipment of cotton coastwise to New York and thence to Europe, thus giving coastwise steamers some advantage over the ocean-going cargo vessels in southern ports.

#### GRAIN IN BULK.

The method of loading grain in bulk requires little detailed description. The grain is carried by the machinery of elevators to the elevator scales and thence through the hatchways into the hold. After a considerable quantity of grain has been loaded, a number of men called trimmers go down into the hold and with wooden shovels level off the grain. This process is called trimming. Ordinarily the marine insurance companies require a cargo of bulk grain to be secured from shifting by means of heavy planks laid on top of the loose grain; layers of grain in sacks being stowed on the flooring thus made. High hatch combings, mentioned on page 30, do away with the necessity for this precaution, for the pile of grain at each hatchway, inclosed by the combings, furnishes a supply to feed down into the hold whenever, by any shifting, a vacant place is made in the mass of grain below.

Grain shipped in canal boats, barges, or other small craft is often transferred to the hold of a ship by means of a floating elevator, whose operation in general is like that of the stationary or storage elevator. The loading of a ship with grain in bulk takes but a relatively short time, for each hatchway may be supplied at the rate of 20,000 bushels per hour and with three hatchways it would take but a few hours of actual running to fill the hold of the largest steamship.

#### IMPROVEMENT OF HARBORS.

The work of deepening harbors and their approaches is generally carried on in the United States by the Federal Government, but so great is the public interest in such improvements that aid is often given by local governments and private parties. Owners of piers sometimes dredge out channels to connect their property with deeper

water. Greater works, such as deepening the Delaware River or cutting a channel across the bar at Galveston, are often aided by large contributions from cities to be benefited.

One of the most important benefits to be derived from deepening a harbor and its approaches is the opportunity for having lower ocean freight rates to and from that port. For, as stated on page 30, large ships are able to charge less than smaller ones, and large ships can float only in deep water.

Moreover, since steamship lines are building larger and larger vessels as time goes on, it is necessary for harbors and channels to be deepened if they are to continue to accommodate the better class of ocean traffic.

Two years ago (in 1905) the minimum depth at mean low water of three of the deepest channels leading from the ocean into harbors on the Atlantic coast of the United States was about 30 feet. Now the endeavor of the leading ports on that coast is to have a minimum depth of 35 feet in the channel. The advantage of a port with deep water over one with a channel not so good is apparent. The larger part of maritime trade tends to accompany low freight rates, and they in turn are brought about by making ports easily accessible to the largest steamships.









## PUBLICATIONS OF THE DIVISION OF FOREIGN MARKETS.

### BULLETINS.

[To be procured, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington, D. C.]

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- No. 2.—Same. The German Empire. 1895. Price, 5 cents.
- No. 3.—Same. France. 1895. Price, 5 cents.
- No. 4.—Same. Canada. 1895. Price, 5 cents.
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On July 1, 1903, the Division of Foreign Markets was transferred to the Bureau of Statistics; since that date the following bulletins, prepared by the Division of Foreign Markets, have appeared in the series of the Bureau of Statistics:

- No. 27.—Wheat Production and Farm Life in Argentina. 1904. Price, 10 cents.
- No. 29.—Methods and Routes for Exporting Farm Products. 1904. Price, 5 cents.
- No. 20.—International Sugar Situation. 1904. Price, 10 cents.
- No. 31.—Imports of Farm and Forest Products, 1901-1903. Price, 5 cents.
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- No. 52.—Imports of Farm and Forest Products, 1904-1906. In press.
- No. 53.—Exports of Farm and Forest Products, 1904-1906. In press.
- No. 54.—Trade with Noncontiguous Possessions in Farm and Forest Products, 1904-1906. In press.
- No. 55.—Meat Supply and Surplus. 1907. In press.
- No. 65.—Russia's Wheat Trade. 1907. In press.
- No. 66.—Russian Wheat and Flour in European Markets. 1907. In press.







